

AVIATION WEEK

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DEC. 11, 1950

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Aviation Week

Volume 53

December 11, 1950

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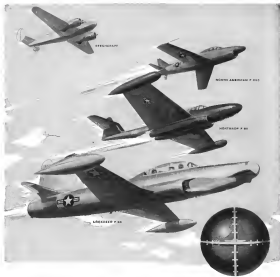
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NEWS DIGEST

DOMESTIC

Smith and Sperry personal plane production is being suspended by Aero and Lonsdale as soon as those planes on which work has already been started are completed. Growing material short ages and delivery orders are reasons for the stop.

Boeing Aviation Corp. has purchased the plant facilities of Carna-Wright's Vetus Aircraft Manufacturing. Dovesport, Iowa, and plans to use the \$14,000 in its acquisition to fund stepped-up order orders for light and medium aircraft. The new Boeing Aviation division (the 17th, exclusive of sub-division) will continue to make precision and replacement parts for Vetus. Boeing expects to increase employment at the plant to 2600. Location of the factory fits in with Boeing's plant expansion policy.

Mr. Gen. Chester J. Chennault won a two-way judgment covering \$1.5 million in assets and properties of China National Aviation Corp., Central Air Transport, and Chennault Civil Air Transport. The Chinese Government had seized the companies' assets in Hong Kong and the court there upheld their claims. This latest ruling cleared five of nine assets brought by Chennault in this country, involving holdings of the companies here.

Elmer Helicopters has been awarded a \$100,000 contract covering development of an "annual and greatly simplified" set of procedures for rotary wing aircraft. Work on the contract has been started by the company. Elmer has been doing extensive jet research for more than two years.

Personal and executive plane shipments by nine companies in October came to 211, including 116 of four place or more, and 77 two place, with a total dollar value of \$1,276,000 net billing was. Shipments by nine companies in September came to 201 planes valued at \$1,912,000. Come in October fell with 94 shipments.

Six percent Shaker pay increase by Lockheed Aircraft has been ratified by members of the Aircraft Chapter, Engineers and Aircraftmen Assn. Covering about 1400 skilled and hourly engineering personnel, the increase is retroactive to Oct. 16.

High Division, NACA's director, has been selected to receive the 1950 Daniel Guggenheim Award from the American

Society of Mechanical Engineers, Institute of Aeronautical Sciences and Society of Automotive Engineers. The citation is for "outstanding leadership in aeronautical research and leadership in aeronautical research to aeronautical science." The presentation will be made at the 145th Annual Meeting at the Hotel Astor, N. Y., Jan. 29.

B-50D successfully completed an accelerated service test program in 1950 flight by its 36 missions in 147 combat weight. Last flight was a 40 hr mission reaching a target in Mexico from Ft. Worth within a specified number of hours, minutes and seconds.

FINANCIAL

North American Aviation has disclosed a 75 cents dividend on its 3,435,031 shares outstanding capital stock, payable Dec. 20 to shareholders of record Dec. 7. The company, now in the first quarter of its 1951 fiscal year, paid \$1.25 during its 1950 fiscal year which ended Sept. 30.

INTERNATIONAL

KLM will submit for Government with Douglas DC-6Bs and five L-749 Constellation with five Super Constellation.

Timex Clock, Belgian aviation patents and former director and general manager of Sylvania (Belgium) Aircraft, died Nov. 27 in Brussels at the age of 62. He held a pilot license issued in 1911. He was the author's board chairman from 1942 to 1949.

New Zealand Government has decided to sell the state-owned National Air Services Office of purchases on three alternatives—outright, in part, or for joint state and private ownership—being studied immediately in Britain, Australia and New Zealand the closing date being Jan. 31, 1951.

British European Airways will operate a BEA Vickers service weekly between Malta and Cairo beginning Jan. 8.

Six Chennault's Bureau, director of Air India International Airlines, died Nov. 20 in a heart attack.

Sabena's first three months of regularly scheduled flights were not busy. Only three 492.6 percent flight hours from Brussels in September and October and 90.9 percent in November. In the first 27 days of operation 17,000 lb. of mail was carried.

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AVIATION CALENDAR

- Nov. 29-Dec. 31—Second annual nuclear science meeting, Oak Ridge, Tenn. For admission apply to: L. G. Gault, D-3 Mail Box, USNR, Oak Ridge.
- Dec. 3—Meeting of California Assn. of Airport Executives, Hotel Ohio, Santa Clara, Calif.
- Dec. 4—Aerotec Associates show and dinner, Times Hall, Philadelphia.
- Dec. 16—19th Wright Brothers Lecture, in series of Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C.
- Dec. 16—Annual Wright Day dinner at the Auto Club of Washington, Presidential Room, Statler Hotel, Washington, D. C.
- Jan. 27, 1953—Miami Aviation Week, Miami, Fla.
- Jan. 30—Third annual Kansas aerial sports conference, representing: Inverness, Kan.; Kansas State College, Manhattan, Kan.
- Jan. 6-7—Florida Air Pilot Assn. air show and exposition of planes and equipment, Opa Linda Airport, Miami, Fla.
- Jan. 6-11—English second air cruise, Miami-Haven, and return of Florida Air Pilot Assn.
- Jan. 15-16—Flat, maintenance show and concurrent conference on plant maintenance techniques, Cleveland, Ohio.
- Jan. 21—An education day, sponsored by the Tulsa Spanglet Junior Chamber of Commerce, Tulsa Spanglet Airport, Tulsa, Okla.
- Jan. 22-26—Weekly ground meeting, American Institute of Electrical Engineers, Hotel Statler, New York.
- Jan. 29-Feb. 1—5th annual meeting of the Institute of Aeronautical Sciences, Hotel Statler, N. Y.
- Feb. 19-23—Meeting covering agricultural research in relation to aviation sponsored by the Flight Patterns of America group.
- Mar. 16-18th annual logic propulsion symposium, Institute of Aeronautical Sciences, Hotel Statler, Cleveland.
- Mar. 19-21—Seventh Western Metal Exposition, Cleveland Auditorium and Exposition Hall, Cleveland, Ohio.
- Apr. 26-30—ATA annual engineering and maintenance conference, Hotel Drake, Chicago.
- May 12-15th annual convention of the Women's Aeronautical Assn. of the U. S., Little Rock, Ark.
- June 11-25—Second annual conference on industrial research, conducted by Columbia University Dept. of Industrial Engineering, New York.
- June 15-17—Industrial relations display, Grand Plaza and Le Bonquet Air Field, Paris.
- June 18-26-29th annual general meeting of the American Institute of Electrical Engineers, Royal York Hotel, Toronto.

PICTURE CREDITS

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*Phone Reading



Washington Roundup

Mobilization

►Military—Washington is thick with talk of all-out mobilization. Official planning under the partial mobilization program gave the program right tentatively to this build-up "to supply as possible."

USAF: 84 groups. There are now only 58.

►Naval Air: 16 reserve air groups, involving about 7500 operating aircraft in the regular Navy and Marine Corps, involved in the 12 groups now programmed, involving 5491 operating aircraft.

The 70-group USAF is out under the supplemental authorization.

USAF plans expansion at points plants. It has asked Congress for authority to use government bonds for this—and will probably get it as the \$17 billion supplemental defense appropriation due for enactment before the Christmas holidays.

Army's Chief of Staff, Gen. J. Lawton Collins, does not want his service to take over technical reserves. He would fight with a case, which has been successfully dismissed since USAF operations for ground support in Korea tend to meet expectations of some. In the last war, Collins points out, the Army had all it could do with nothing more than divisions—and in one before war a division's work had added because of mobilizing some 90 technical air groups for support.

►Civil-Mobilization of civil aviation is set to move forward promptly—instead of being postponed until a thorough air transport mobilization survey is completed probably not before next March.

CIA Administrator Donald Trump now has an order on his desk which would set up a stopgap program. It directs CIA regional offices and airport managers to work together, call meetings of airport owners and pilots, inaugurate night curfew, schedule evacuation practices and demonstrations.

►New Mobilization Director? A full-time director for civil air matters may be named at the newly-established Civil Defense Administration in the push to speed up homeland mobilization—the running clock to national security.

Civil air mobilization, along with all other civil defense programs, will be transferred to the new agency from the National Security Resources Board, which assigned an industry-labor group, under the chairmanship of Edwin Kantatz, to make a survey. Kantatz's duties as CAR chairman and Air Coordinating Committee chairman it is believed, will make it impossible for him to give the necessary time to the program as it moves into high gear.

Sen. Estes Kefauver, chairman of a Senate Armed Services subcommittee, hopes to get by the end of the year legislation authorizing CDA to move forward with a \$1 billion, three-year civil defense mobilization program, financed partly by the Federal Government and the states. Most of the expenditure, \$2.2 billion, would be for shelter construction; \$12 million is earmarked for communication equipment for shelter.

Flush Deck Carrier

Navy is moving ahead with a 50,000-ton flush deck carrier for operations in Japan, Korea and Taiwan. It will be higher than the 65,000-ton United States, modified by Rear Admiral Secretary Loren Johnson, and will have greater maneuverability.

House Armed Services Committee Chairman Carl Vinson has introduced legislation authorizing the construction. Navy doesn't want it, but Vinson wants the project to have the clear sanction of Congress.

Transportation Legislation

The Transportation Association of America hopes to have legislation in writing, the 1940 Transportation Act and the 1938 CAA Act ready shortly after the turn of the year, and will make a vigorous effort to put it through the new Congress.

TAA's main objective is to start off what its members now view as handicapping on the well-earned government ownership of transportation. Air Transport Assn. is working with TAA on this.

But the prospect is that it will, which dominates TAA will resist on a single regulatory agency, integration of transportation operations and ownership, and a verbal shot off of public aid to air. If TAA adopts these plans, ATA will not set, fight the legislation.

ATA showed expenditures of \$156,995 for the first three quarters of this year in its lobby registration upon United Air Lines contributed \$7800.

Through Air Service

One Dumbuck to Airline Travel—Hours of wait at an airport or city for surface transportation to a small town destination will be ended when Air Transport Assn. and National Air Traffic Conference sign a contract in the next few weeks providing through air service to all points. Only legal restrictions remain to be worked out. Air lines will be bound at all major airport stop—about 30 at the out-of-the-way points promptly to their destinations.

The change will be up to the individual line operator, but it will mean from 15 to 25 cents a mile, depending largely on the type of plane used. If it comes to more than that, the passenger will pay the fare operator the difference. TAA won't sell through tickets.

Divided Industry

Airlines and manufacturers can do odds over the Justice Department's net to collect alleged "gross" overcharges by the railroads during the last war on shipment of planes and parts for the government, and to have the rates reduced. Aircraft Industries Assn. is going strong support to the suit. It estimates the rails have been overcharging around \$15 million a year on plane and parts shipments—and that the amount is going up with the repeated defense program.

ATA hasn't taken any official position on patent's suit, but some of its members individually are opposed to it. They feel it will set a precedent for harassment of carriers with reciprocal suits by Justice.

INDUSTRY OBSERVER

Lockheed Aircraft's proposed 66-passenger, 40-ft-long transport aircraft L-191 is on ice for the time being because of stepped-up military commitments. An Atlanta sales brochure complete with drawings, specs and design performance, circulated to airline executives, has not met with varying degrees of interest. L-191 proposal calls for a cruising speed of 485 mph, a stall speed weight of 140,000 lb at 26,000 ft. Cruising speed of maximum loading weight of 117,000 lb is 424 mph. Transport version would have a cargo bay capacity of 640 cu ft, with the 66-passenger seating arrangement. Wing loading with top tanks is 91.6 lb per sq ft. Lockheed engineers proposed would develop 12,200 hp, static thrust each of six turbojets.

Travel time between Los Angeles and Chicago, 3 hr 20 min, Chicago to New York, 1 hr 28 min.

Two-engine pilot trainers are under hot discussion again as USAF swings into the year-end expansion. Studies of the program being put forth by Air Training Directorate for Requirements Branch run the gamut in quantities—from 100 to 1000. Questions at Wright dropped up requirements, which would be more expedient from points of economy and profitability—conversion of existing B-25 types (about 1600 available), or new models? Leading contender for conversion is North American, who early this year brought its plan B-25T to Washington along with conversion proposals. New aircraft hopefuls are Canavia, already building the twin engine T-29 for AF, and Martin for military version of its 2-8-2 and 4-1-4. In large quantity, cost of new planes would be about the same as converted World War II types. Training Directorate questions: How much money are we getting?

Plasch's development of the "omniplatform" landing gear for helicopter is beginning to receive heavy military attention. Designed for use on Plasch's H-11 scout rotor in landing on land, sea, or snow, the gear generated tough aerodynamic problems because of its size. The big big floats, now mounted on small airfoils to keep them from colliding in flight and in correct position for minimum drag. Despite the addition of airfoils, Plasch's engineers have managed to hold the gear down to "spec" weight.

On proportional basis, British aircraft and engine companies have far more resources assigned to research and development than American companies. While this gives them an edge in design, production capacity suffers. British Air Ministry has prepared an exhaustive study of the entire production problem for Parliament. Congress is expected not only for dwindling production know-how, but for the future of export and import immediately, lack of trained aircraft production personnel.

USAF has added Republic for a study of cost and performance estimates of the F-84 using Armstrong-Whitcomb's 7380 lb thrust Spectre. This time will include both the "super" version for MEAP (A-10) and the WEFK, Dec. 40. Preliminary negotiations are already under way for report of 100 Spectre engines from the British manufacturer for F-84 installation. Utilization of the British aircraft would give more than four Curtiss-Wright to test up for U.S. production of the British jet under its manufacturing agreement with Armstrong-Whitcomb.

General Electric Co. will use its newly-acquired Turbofan only as a test stand for turboprop. Feeling is that the engine is too large, too heavy and too costly to produce. Company will wait until USAF engineers submit a definite demand for a turboprop engine of the GE Turbofan shaft hp rating.

While military sources predict that this nation will go through a stage with the turbojet engine as a major intermediate in transport operations, industry is not so sure. U.S. plane builders are still "blowing hot and cold" in decision between turbojet and turbojet aircraft designs. Most jet-powered transport built in U.S., these sources say, will probably be a Boeing product.

Overhaul engineering personnel at General Electric's jet facility at Lynn, Mass., begin moving to new Boston office Dec. 1.

WHO'S WHERE

In the Front Office

Ernest Wengmann, former warbird racer for the Coast Pt. Worth B-16 plant has joined Pando Helicopter Corp. in role, president of manufacturing. WAF Co. since 1962, Wengmann has more than 20 years' experience in aircraft production. He has been associated with Fokker, Lockheed, Naval Air Station, Bellanca, Fairchild, Sikorsky, and Edo. He held high-level production posts at General & Electric, Twin Falls. Plans to plant his address to his former position.

Kenneth A. Lander has been made vice president-comptroller of Fox Aircraft-Cosmo Aircraft. He was previously treasurer of S. E. Ponce & Co. and its affiliate, N. Y. General & Chemical Works, prior to joining Pando last July.

B. Wengmann King has been named managing director of Sperry Gyroscope Co. of Canada Ltd., newly formed subsidiary of the Sperry Corp. (U.S.). King served with the RCAF from 1942-1945, then joined Canadian, Ltd., where he was producing aircraft.

What They're Doing

Robert T. Kosey has resigned as public relations manager at Fairchild EDA's aircraft division. He plans to return to public relations work at Washington, D. C.

Isaac Altschul, Aviatron West's financial director, who is also an independent consultant, is leaving the aviation business before the N. Y. Institute of Finance. Altschul will devote the rest of his post industry Dec. 14.

Changes

T. F. Biddle has joined Luskair Airplane Corp. as factory manager. Richard S. Speer has been appointed senior engineer to Gordon D. Brown & Associates, Los Angeles air cargo load-carrying specialist. Charles D. Pomeroy, Jr., has joined the electronics and production section of General Electric's engineering department.

Robert C. Dorence has been made chief of design at Chance Vought Aircraft Dallas. Dr. L. Miller has been named purchasing agent at Northrop Aircraft and E. M. Olson has been put in charge of the company's newly combined flight operations department.

Honors and Elections

Louise B. Richardson, Executive Assistant, USAF (Ret.), has been elected president of the Institute of Aeronautical Sciences for 1971, succeeding J. B. Kunkel, local chairman of North American Aviation. New vice presidents of the Institute are Raymond D. Kelly, U.S., William C. Biederman, Cooney, William F. Schwendler, General Motors and Edward C. Wells, Boeing. Treasurer for 1971 is E. E. Allen, Alfa Singh, Co. Richardson was S. Paul Johnson, American Robert D. Davis, secretary, and Joseph J. Melton, controller.



Navy's new Martin PSM Marlin, long-range patrol and anti-submarine plane, with Hamilton Standard propellers.



AVIATION WEEK

Industry Poised for All-Out Mobilization

Next steps awaited
as President asks
new funds in crisis.

Government and industry last week faced up to the new emergency steps arising from the Austin crisis with plans for a rapid manufacturing expansion, and a steady buildup of USAF and Naval Air strength. Patterns are not for manpower controls and urban mobilization.

Core of the production expansion and military air increase at the \$16.8 billion supplemental defense appropriation submitted to Congress by the President. At always, hearings will be held on the money aspect—but it nevertheless is expected to be passed and the funds available before Christmas. The President said:

- \$2.1 billion for USAF aircraft and related procurement
- \$155 million for Naval aircraft procurement
- \$155 million for Naval aircraft and facilities
- \$115 million for USAF research and development

- \$800 million for USAF construction
- \$503 million for USAF "other than aircraft" procurement (large electronics and communications equipment)
- \$704 million for USAF maintenance

Total requested for USAF is \$4.6 billion. The aircraft procurement part of the \$2.1 billion, plus the aircraft research funds previously asked for fiscal 1959 gives USAF a total of \$6.2 billion for aircraft in the year ending next June 30.

Very few have \$2.3 billion for aircraft procurement. Now it will have \$2.4 billion for fiscal 1959.

The new money will come.

► **Mass Funds—Aircraft** procurement for the Air Force will be increased over the 4628 planes programmed for this year—but not greatly. About \$1 billion of the procurement money is to other price rises. The rest is expected to buy not more than about 1800 aircraft.

A substantial part of the Naval Air procurement money is for electronics equipment and parts. But the \$155 million planned for procurement this year will probably be increased



INCREASED ACTIVITY in the nation's aircraft plants is typified in these two views of...



WORKING S B-47 has at Wichita, where the winging bombers are taking out in quantity

Navy initiated in September that the level was 455 planes short of its "minimum" requirements.

Plant expansion—opening the way for a larger production program in the 1952 fiscal year—will get underway. Prospects are that plans are ahead by about the end of the last war—at Memphis, Tulsa, and Omaha—will be put back into aircraft manufacturing. Machine tools, a substantial part of which will be utilized in the tooling program, are now being stored at Macetta and Omaha. Jet engine production by General Electric Co. at Lockland, Ohio, and by Westinghouse Electric Co. at Kansas City will probably be expanded.

► **Research Equipment—Research and development** will be already increased. The \$115 million for USAF and the \$241 million already made available for this year, make a total of \$356 million. In the last fiscal year, \$218 million was available. A substantial part of the \$115 million for Naval aircraft and facilities is for research and development. Bureau of Aeronautics already has \$95 million available.

Construction of the large-scale guided missiles growing ground-based in the Bureau River area in Florida will be rushed to early completion by USAF. Its total estimated cost is \$75 million. USAF spent \$5 million on the missile last year, and has received only \$6 million for it this year.

► **When USAF Needs—USAF now has about 60 groups in operational status. Supplemental funds** granted a few months ago permitted building to 69 groups. Previous Congressional order permitted USAF building beyond 70-group structure. The new appropriations approve the extensive 70-group class. USAF programming calls for 84 groups to be in being at least by June, 1957.

► **How's the Way Washington** claims last week was the immediate effect of almost mobilization.

► **Costs—Employment**—Employees would be forced to great occupations need of the nation's industry were saved. Salaries would increase by 10% at least temporarily.

By Karl T. Compton, of the report of the Department of Defense Research and Development Board, is conducting



Garage view showing Clipper Seal in sealed in airplane equipped at Van Norman non-type milling machine.

Oil seals overheating?

... use the seal that's designed to run cool!



SHAPE IN DESIGN. The Clipper Seal consists of only two parts—a one-piece cast-aluminum body and a specially designed garter spring, the two assembled into a single compact unit. Available in both styles and various sizes.

The company drawing shows above indicates how Clipper Seals provided the answer to a difficult sealing problem for the Van Norman Company, well-known makers of quality-built milling machines.

These machines have adjustable camshafts that are usually enclosed to prevent oil leaks and other abuse from damaging moving parts. The camshafts are often at high speeds as high as 3000 rpm. Yet the oil seal must function without overheating.

After trying various seals, the Van Norman Company selected Clipper Seals because their simple design minimizes friction and wear, running cool, trouble-free operation and an unusually long service life.

In addition, Clipper Seals do a highly efficient job of keeping lubrication in and keeping dirt and abrasives out. Their tough, dense face has the rigidity necessary for a press fit in the cover, while the flexible lip, held in light but positive contact with the shaft by a specially designed garter spring, provides perfect sealing at all times.

These precision-molded oil seals are available in a variety of designs and with a choice of hard and soft compositions to adapt them to practically any sealing requirement. They are furnished in sizes up to 6 inch diameters from 1/2" up to 66", for temperatures up to 450° and for shaft speeds up to 1500 rpm. For complete information, write for Brochure PK-664, Address: Johns-Manville, Box 250, New York 16, N. Y.



Johns-Manville CLIPPER SEALS

a survey of the nation's scientific work power accounts, with the idea of establishing a pool of scientific talent.

In preparation for Assistant Secretary of Defense, Dr. Aron Klevorink, is a complete survey of the nation's entire manpower resources.

► **The Draft—**Already drawn up, are complete "phase" plans for mobilizing that nation's manpower. These are aimed, of course, to the training capabilities and facilities of the three services, as well as to the "nonmilitary" at the situation. Actually, of course, the nation went into a state of semi-mobilization when the Korean war began. But but has been at the bottom of our industrial and manpower mobilization problems. Our planning, previously, had been geared to "all out" not "semi."

Industry was, there is no immediate need for the few of drawing boys employed in the industry. The nation is aware of the near destruction effects of that action in World War II.

Already drawn up, and in effect, is a list of critical occupations. These will be included to cope with the situation. The control list not made upon the basis of the following criteria:

► **The demand,** in essential industries and activities, for persons qualified to work in the occupations would exceed the total supply under conditions of full mobilization.

► **A minimum training time** of two years (or the equivalent in work experience) is necessary to the satisfactory performance of all the major tasks listed in the occupation.

► **The occupation is essential** to the functioning of the industries or activities in which it occurs.

► **An Transportation—**Services providing the most acute industrial or military areas of the country would get the biggest traffic demand. But some feeder industries in less acute territories might be induced into central-line their plans, should any existing.

► **Production** and production: the war side matters would be something like World War II.

► **Capital shortages** would be more feeder industries.

► **Transportation** losses to the Military Air Transport Service would probably fall low and high. Strategic plan first.

► **Land forces** would be more clearly in fact and would have to look two generations in mobilization planning and action.

► **Regular** men would take with much and hardly plan first.

► **Force** goals: tests probably would field all industries in profits under a ceiling somewhere between 5 and 1 percent. Regardless of said under the RPT would put a ceiling on profits. Four percent would be better for most activities.

► **Character** affects for the industry would

beon business for industry. MATS would take place at need-up to a point where government thought the actual old industry were down to an inadequate number for satisfactory functioning. Then spent until jobs outside the war there could be carried off for MATS in contract, as with the present Pacific War, to Japan. This would allow flexibility of an transport, so MATS would be able to take in money places from abroad.

► **Non-critical** industries would leave equipment to other armies as well as to the military.

► **Rapid flight** plans being made would be ordered. Even flight, not aviation when its destination, must clear before departure and during flight. Trans ocean carriers already have an efficient clearing system going. Their planes are loaded all the way.

► **Research and Development**—As effects of war loomed before us, the present interest of expenditure in research and development will grow greatly. Funds allocated previously to R&D activities will be a minimum of about \$4 out of every \$5 for all research. Of the funds going to research, approximately \$1 out of \$4 goes to missile research. That is on a service wide basis.

Research and development generally, however, would increase proportionally with allocations proposed by other military activities.

Currently, an approximate \$600 million for guided missiles is included in the supplemental defense appropriations submitted to Congress. Defense Department now has approximately \$180 million for guided missiles. The additional funds will be used for in a 3500 missile program for the year.

Defense Department plans for a build-up in a \$2 billion missile research program in the 1952 fiscal year, reaching \$3 billion a year program by the beginning of 1954.

The comparison of \$2.3 billion as spent for aircraft production research and development in USAF and Navy in the 1950 fiscal year.

Here's How to Get Defense Loans

Aircraft equipment and parts manufacturing, one now apply for long-term government loans for building defense production facilities.

After two months of organizing the machine, materials of the Defense Production Act has been set and the production loans have been awarded. The \$200 million appropriated by Congress is all set to be loaned. And when that's done, Congress is committed to voting at least \$1.4 billion more.

These long-term national defense loans are designed to supplement the \$1 billion guarantee already being made by the Federal Reserve Board. (Article 10, Title 31, U.S.C.) When an aircraft manufacturer is ready to start production, exclusively for fairly short-term working capital purposes, the defense loans, on the other hand, can be as long as 30 years—long enough to finance expensive and durable facilities, such as buildings, foundations and stamping presses.

The Reconstruction Finance Corp. has been designated in the program outline. But RFC won't make the final decisions. If you want such loan, you'll have to add one of the four certifying agencies named in the Defense Act—probably Commerce.

It has set up a loan office in Washington to advise applications from the aircraft and other industries. But Air Force and Commerce field offices, as well as practically any government agency you may be dealing with in various cities, can accept your application and forward it to the capital region.

The appropriate agency will screen your request for its necessity related to other projects, then investigate your credit standing, your certified, your application, your record in the National Defense Resources Board for a final sign-off a check, so far that you Committee isn't trying to hog all the available credit.

Get your request to the loan. If you fail, try too much officials may negatively turn you down on the ground that they can get more defense loans somewhere else for less money.

You must make it to a definite contract. The Defense Act specifies that the government's money be used to help fill defense orders. Eventually some borrower is now nationalities, services, companies and countries and the government equipment may be eligible. But right now, initial loans will probably be limited to borrowers with defense contracts on hand or definitely in process.

Get your application in early. Because interest in government loans has been low. Commerce and Interior have been getting more cases over time the air war power.

NSRD issued several million dollar loans within a few hours after the 12-page forms were made available last week. Officials expect to receive more good loan proposals to review for them. So borrowers who can't wait will have the best prospects will probably get loans.

For non-government leaders first. The role-play REC is a leader of first start-up—still holds. In fact the loan loss rate where the rate has been. The agency will be known. If you want a loan from your bank? From an insurance company? Don't you apply for a V loan?

Piston Converting Production On

Four-engine Conquest Loam will stay on the Conquest Vulture in push-back after all, following a decision of the board of directors last week. The new model 240 A has some improvements to help sell the plane to commercial airlines.

Chascom Flyp Dallas says studies on new adjustments to Conquest "can modify produce both commercial and military versions of the plane."

The new Conquest-Lam has these features:

► **New Electrical System**, in completely different, one feature being easily removable power for maintenance.

► **Frank & Whitney 2400-hp.** CR seats six.

► **Gross Weight maximum** is up to 45,375 lb., compared with 41,700 lb. on the current model.

► **Performance**—and an modification in the cockpit, looking to the day of conversion to turboprop power and higher altitudes.

Designed for later turbo-prop model is, one feature of this model is a study being made for experimental flight using two 2750-hp. Allison 501 turboprops.

Walter H. Beech Dies in Wichita

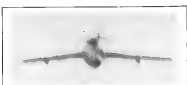
Walter H. Beech, founder, president and board chairman of Beech Aircraft Corp., Wichita, died of a heart attack during the night of Nov. 28. He was 79.

He was married in aviation since his early youth. Beech during World War I actively began a career that saw him become a pilot, designer and executive. Shortly after the war he joined Beech Aircraft Corp. in a first pilot, sales representative, and designer. He left the firm in 1925 to found Travel Air, where he not only was an active executive and designer, but also successfully has played a part in competition.

In the years 1929, 1929, the company was the country's largest producer of commercial planes. Then Beech also had a prominent hand in turning out the convertible bi-wing, "Beechcraft" racer which became the star of the 1929 National Air Races when it attracted 1949 speed to beat the best the Army and Navy could offer.

During the financial crisis, the company merged with the Wrights, where Beech was president of the 31 years and Wrights plants and was president of the Curtiss-Wright Sales Corp. in New York.

In 1932 he was named to start the Beech Aircraft Co.—predecessor of the present corporation.



Report From Korea on the MIG

The following account report on the Korean MIG 15 intercept, which has figured prominently in recent news dispatches from the Korean battlefield, was written for Aviation Week by Alpheus W. Jenson. An McGraw-Hill World News on-the-spot reporter in the Far East Jenson has been covering the Korean war at first hand.

The note will supplement other material you have [Aviation Week Nov. 15] about that MIG 15 that has cropped up in the Korean war. Most of the comes from Navy Panther pilots, a couple of whom have had a good look, but quick. The accompanying photograph, a museum enlargement from Korean gas camera film, may be of some help. It happened in the second day they have shot it, the Panther boys say that if fewer right, the MIG 15 should only pass Mach 1. Four 1970 in a slight climb was after one which climbed right away from them and went up hill during it.

Another of the boys spotted one down underneath about 2000 ft., after 5 and went after him. It looked like an easy kill. But just as it was being shot the MIG emitted a couple of puff of white and then a stream of white smoke from the tail gun and left the Panther "in it" was heading off. The Panther was about 20 knots over the outline at the time, but the MIG went off in a dive to lose contact.

► **Just or Afterburning?**—There's no confirmation of what caused the white smoke. It might be natural jet fuel, some form of water or other substance for rapid acceleration, or afterburning boost. Other MIG 15s have been observed emitting the same smoke pattern when making a sudden turn or stop. No black smoke has been observed during these engagements.

Panther pilots say the MIGs could hold F4F and F80 any time they want if they would just learn how to work together. But fortunately there has been little evidence of combat teamwork, and no aggressiveness by the MIG pilots.

► **Nearly Delta**—Further pilots who've gotten good reports say were amazed at the extreme swept back structure of the wings. None of the identification sheets were close. The wing tips are almost even with the tail. There is a slight taper at the tips, not much, but a definitely complete taper.

If they filled in the space between wings and fuselage, it would make a perfect delta wing. The horizontal stabilizer is placed very high, but not quite a T-tail. You can get some idea of that construction from the photo, which is not very good.

This believe the MIG comes 37000-gps.

► **Design**—Combustion—Usually appears characteristics are range and strength. Both Air Force and Navy pilots believe the MIG has a short range, but the admittance may be influenced by the fact that the MIGs are constantly dodging back over the Yalu River to sanctuary on the Chinese side.

► **One theory**, Air Force, has Russian pilots from the MIGs with orders not to hit down on the wing side of the lower line, but the failure of the MIGs to get into a full scale scarp or to penetrate deeply into North Korea's coastline.

They also don't think that the MIG can withstand the G pulled by either the F80 or the F86. But there's no proof of this either.

How Airlines Buy Under New Controls

Purchasers of planes deal with CAB; parts handled through CAA.

The civilian aviation industry had the word this week on where it stands under the whole new system of controls being administered by the National Production Authority.

Materials for the manufacture of planes, and the supplies of materials and components needed to keep planes operating—all these are to be controlled completely from Washington just as soon as the controls can get organized to do the job.

The controls are:
 • The Chairman of CAB, who will be "authorized" for "whole transport-type airplanes." He will determine which airlines get these planes that are allowed to go to civilian use. Starting now, if anyone wants to place a new order for a transport, the CAB chairman will authorize the company and the priority is not. Decision depends on plane supply and country's need.

• The Chairman of CAA, who will be the "licensee" and the director of all materials, parts equipment, and supplies for the maintenance, repair, and operation of all civilian aircraft and component facilities. He is also "licensee" for the lightplane manufacturers and users.

These two officials, however, have to go to the National Production Authority, the chief controls agency headed by Gen. William Hearn Harbo, and compete for supplies and materials against other industrial users of critical materials like copper, aluminum, and compounds.

DO Ratings—At the moment there is no mention at NPA—which has control over most industries and most materials—of giving priority ratings ("DPD" orders) to select from the military and the Atomic Energy Commission.

The use of "DO" certificates or orders placed by these agencies requires compliance to give them preference over non-military or civilian orders.

Representatives of the various branches of the aviation industry are to be filed on a spot basis. That is, for the long-range future, the civilian side of the aviation industry was kept reserved to as priority rating, which might, for instance, give it preference right after military and AEC, but ahead of other non-military users.

NPA (Director—Frank, interim, place orders, and parts operators will make their needs known to CAA and



DOUGLAS ORDERS for airline DC-46 and DC-46s continue largest commercial backlog.



MARTIN ORDERS for 4-D-4s were, at first up to last week, all from one customer.



LOCKHEED ORDERS for 749s are for both Model 749 (top) and Super Constellation.

CAB—and these agencies, in turn, will get a "license" from NPA.

A "license," in NPA's new controls language, is a sort of emergency order directed to a supplier, commanding him to deliver a certain specified quantity of a particular material or component to a specified user. Up to now, NPA directives have been too mainly to help out manufacturers who might have had to cut back their operations or even close down for lack of a small amount of critical material such as rubber or aluminum, or a particular component.

According to CAA Administrator Donald W. Nyrop, civil aviation's "aircraft and parts requirements are less

than 5 percent of the total dollar volume of military and civil orders." But plane makers and parts makers are swamped with military orders, and without special treatment, the civilian side of the aviation industry could be squeezed out of the picture entirely.

On effect of this, according to this month of the Air Transport News, "we need to increase the cost of military transport now on an order."

Some of these transports, however, are identical with the military version.

Because of the recognized fact that "the large-scale volume," the lower the price, the military benefits by the 250 airline-type planes on order (see table)

Airline-Type Planes on Order

| Customer | Douglas | Lockheed | Martin | Total |
|------------------------------|---------|----------|--------|-------|
| Air France | 4 | 2 | 4 | |
| Air India | — | — | — | — |
| American Airlines | 11 | — | — | 11 |
| Aviation Oil Company | 2 | — | — | 2 |
| Airlines | — | 2 | — | 2 |
| Bozell Airlines | 1 | — | — | 1 |
| Chicago & Southern | — | 3 | — | 3 |
| Compasso Mexicana de | — | — | — | — |
| Continental | 1 | — | — | 1 |
| Confidential | — | — | — | — |
| Delta Airlines | — | 14 | 35 | 49 |
| Eastern Airlines | — | 10 | — | 10 |
| KLM | 7 | — | — | 7 |
| National Airlines | — | 2 | — | 2 |
| Philippine Airlines | — | 2 | — | 2 |
| Pan American Grace Airways | — | — | — | — |
| Pan American World Airways | 18 | — | — | 18 |
| Scandinavian Airlines System | 2 | — | — | 2 |
| Swire Air | — | — | — | — |
| Stark Airways | 1 | — | — | 1 |
| TWA | — | 14 | 41 | 55 |
| Unassigned | 6 | — | — | 6 |
| United Airlines | 20 | — | — | 20 |
| Air Force | 18 | — | — | 18 |
| Navy | 11 | 11 | — | 22 |
| TOTALS | 114 | 79 | 76 | 269 |

Manufacturers' Commercial Backlog

| MANUFACTURER | PLANES | ESTIMATED VALUE | ANNUAL SALES |
|--------------|--------|-----------------|--------------|
| Beech | — | — | \$1,317,500 |
| Cessna | — | — | 2,900,000 |
| Douglas | 114 | \$18,700,000 | 5,500,000 |
| Lockheed | 79 | \$3,800,000 | 7,000,000 |
| Martin | 76 | \$8,000,000 | 1,662,500 |
| TOTALS | 269 | \$26,600,000 | \$28,900,000 |

The new holds true down the line to the airline manufacturer's supplier. ATA says that the commercial time

period on order means purchase of 571 million worth of work outside airplane plants.

Equipment and components—516 million.

Purchased parts—57 million.

Raw materials—35 million.

Factory equipment and supplies—55 million.

Proffers explained—Delivery of the details of the new CAB/CAA/NPA setup was made by Nyrop in a speech before the Aviation Distributors and Manufacturers Ass. in Los Angeles, Dec. 1.

Under the new arrangement, NPA's "directive" is the plane maker or parts

supplier ordinarily will take priority over all the "DO" orders at the

moment. A. V. Roe is having cut a few quantity of the Shackleton, long-range reconnaissance biplane for Coastal Command, Short Brothers is producing the other side of the coin to build a good many women had off during the past two years since the work on the Short flying boat was

slowly up, and Handley Page, having finished its 15 Hercules transports for RCAF, has cut a few quantity of the RAN's Transport Command to go on.

Production of the Canberra in Australia has already been planned and reports indicate it may also be produced in Canada. Then it is more certain that USAF is also intending to buy a substantial number of this type.

Manufacturers Aircraft manufacturer who need any kind of material or component for the manufacture of (airplane aircraft) are to apply directly to CAA, Washington.

Others. All others are like that, making requests to the CAA regional office, which will process the paper and forward them to Washington.

While that emergency program gets underway, CAA and CAB which are taking the first steps toward drawing up plans for scheduling production of new transport planes, parts, and components. When such program are worked up by the government officials, in consultation with all elements of the aviation industry, they will be put into the spotlight along with similar plans drawn up by the other civilian industries—power, petroleum, transportation, metals, chemicals, etc.

The idea is that by maintenance, the stepped-up consumption of scarce materials by the defense program will require almost complete control of the civil use of all scarce materials—steel, copper, aluminum. The controls at NPA figure they will have to put into effect by that time something like the "Control Materials Plan" at World War II.

Britain Mobilizes For Production

(McGraw-Hill World News)

London—Britain is putting several of its warlike bomber production firms to work on the English Electric Canberra, transport medium bomber.

In addition to production quality at the English Electric factory at Preston, the Ministry of Supply has placed similar orders with three other British aircraft firms: A. V. Roe & Co. Ltd., Manchester; Short Brothers and the Leyland Ltd., Belfast; and Handley Page Ltd., Cricklewood, London.

None of these four firms has production orders for any large number of other designs on their stocks at the moment. A. V. Roe is having cut a few quantity of the Shackleton, long-range reconnaissance biplane for Coastal Command, Short Brothers is producing the other side of the coin to build a good many women had off during the past two years since the work on the Short flying boat was slowly up, and Handley Page, having finished its 15 Hercules transports for RCAF, has cut a few quantity of the RAN's Transport Command to go on.

Production of the Canberra in Australia has already been planned and reports indicate it may also be produced in Canada. Then it is more certain that USAF is also intending to buy a substantial number of this type.



THE LOOKS LIKE THIS one, but will be bigger and heavier in the production version.

USAF Decides on Fairchild T-31

Advocates of heavy trainer win point as AF pulls out of joint evaluation to build up its own trainer fleet.

The joint Air Force-Navy trainer evaluation program, held last month, has been decided in favor of the Fairchild T-31, as far as the Air Force is concerned.

Five types of planes were involved, covering a wide spread in weight, engine power, size and type. In addition to the T-31, they were the Beech T-58, T-60, T-61, the Handley-Clayton and Republic P-47B.

Although official announcement is still forthcoming because of several decisions internal political action, USAF has decided to hold on to the heavier planes for training its own fighters. So the AF has withdrawn from the joint evaluation.

■ **Draw Decision**—Actually, decision of the Service (Office Head) is twice of the Fairchild T-31 amounts to a "draw decision" in differing Air Force. One usual concept: one primary basic plane, one weight, and power plants and what is best for the service job.

There is a continuing disagreement over aircraft for training while Air Force orders. One factor between it better to train early first in light, intermediate aircraft, then advance them to heavier planes in training program. The service group believes it won't do that trainer, immediately in heavier planes.

Advocates of the former method feel it more economical to begin with training on light aircraft because it is felt the folding will only in less time at low cost to the government. This group believes he is therefore more able to group the complexities of advanced training and safety in techniques after learning to heavier craft.

Advocates of the other method be-

lieve that, while it takes longer to add a student in the heavier trainers, he will have obtained a more thorough grounding in pilot techniques because of the plane's greater weight and power and because of more dual instruction.

■ **T-31 Choice**—Fairchild T-31 configuration which will result in a result of the evaluation will change somewhat. The plane now features conventional two-wheel landing gear and standard wheel, 9-wheel landing gear 8-8-13 wheel, and a high plane engine.

When span is 31 ft 9 in., length, 27 ft 11 in., height, 9 ft 10 in., maximum weight is 16,000 lb., cruising speed at 65 percent normal rated power 140 mph, service ceiling 19,000 ft. Maximum range is 800 mi. at 110 mph. WE empty is 2,517 lb., loaded, 17,570 lb.

While general configuration of its prototype will increase overall, the more, the production version will incorporate a heavier landing gear in place of the present main-wheel gear, the engine will be a 1,000-hp "flat" engine. Adoption of the Landing flat engine, suspended to prevent vibration of the nose wheel, also lowers the nose section in line of the plane, which will provide better forward visibility.

Military analysts also state that the proposed Fairchild trainer will have a slightly longer, heavier wing. The plane will be about 100 lb. heavier.

■ **Eight-Engine Program**—The joint Air Force-Navy trainer evaluation equally considered a four-engine program of developing a set of specifications for a trainer which could be studied by both services and other allies.

Because of that, General Brink and Cals also had aircraft entered in the U.S. evaluation. British interest

stemmed from the fact that in wartime a large number of these pilots would be trained in the American plane training from the planned design competition. Because of the Air Force to pull down from the joint evaluation which the optimum plan. Unique because of its application in a step between great performance and training material, the plan was being carried out by the military as well as the industry.

Whether the joint evaluation program by the two services is to be permanently shared or temporarily deferred while building up the trainer inventories of the Air Force is still as decided.

Evaluation at Randolph was held around a comparison of performance and flight characteristics of each competing plane in three of the North American T-28, now the standard USAF trainer.

■ **NAA Program**—Already committed to production of more than 600 T-28s, North American is now through ground-up to pilot techniques because of the plane's greater weight and power and because of more dual instruction. Deputies to MDAF participants will be developed into present USAF deliveries and all begin again.

North American T-6 trainers (used in basic flight school) being converted to "G" series, had been scheduled for phase out in USAF training program as new trainers moved in. Kees stated the T-6's were converted to T-28s.

North American T-6 trainers (used in basic flight school) being converted to "G" series, had been scheduled for phase out in USAF training program as new trainers moved in. Kees stated the T-6's were converted to T-28s.

Other U.S. means which participated in the evaluation at Randolph AF will be:

- **Beech T-58**—Wing span, 32 ft 9 in., length, 25 ft 10 in., height, 10 ft 10 in., gross weight 27,410 lb.
- **T-60**—T-31—Wing span, 29 ft 10 in., length, 27 ft 11 in., height 9 ft 10 in., gross weight 17,570 lb.

Also entered in the evaluation were:

- **De Havilland Chipmunk**—Canadian entry in the joint evaluation.
- **Beech T-58**—British entry to have the T-58's performance up to 15,000 ft as the Spafair fighter.

Specifications were in setting up the joint evaluation were in nature. This provided only that the craft be in a plane capable of night and acrobatic flight and that it have a range of more than 500 mi. and no endurance of not less than 4 hr.

PRODUCTION

NAA Garners Largest Contracts

North American Aviation, Inc., received by far the largest dollar volume (\$9,216,500) of negotiated USAF contracts of \$25,000 and over awarded during the period Jan. 26 through Nov. 24 as released to Aviation Week. Total for this period was \$20,011,112.

NAA's Los Angeles plant was awarded \$9 million for miscellaneous assemblies and subassemblies for aircraft, and Downey received a \$220,550 contract for aircraft modifications and modifications.

To meet previously purchased contracts to climb, these plants secured a total of \$1,139,195 in contracts, putting this time in second place only to aircraft work.

Complete list of USAF awards totaling \$25,000 or more during the period:

■ **Assignment Company**, Burbank, Calif., delivery, delivery, \$170,525.
 ■ **North American Aviation, Inc.**, Burbank, Calif., maintenance, \$15,100,775.

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AERONAUTICAL ENGINEERING

Optical Tooling Eases Airframe Building

Republic develops new approach for erecting large assembly fixtures.

New accuracy and efficiency have been achieved by Republic Aviation Corp. with a simple, nonusing method for erecting large tooling for aircraft structures.

The scheme offers distinct advantages in current industrial mobilization planning and for quick set-up of jigs and fixtures at distant sites in an emergency. It is estimated that in an overall tooling program of \$1 million, the new approach will save 10-15 percent.

Optical Collimation—The method uses British (Taylor-Hobson) optical instruments and "line-of-sight" German jet assembly ratings brought home after the war.

Under proper conditions, it permits working to an accuracy of .0005 in. in a 50 ft. span (vertical is horizontal) and to 1/2 sec. of angle.

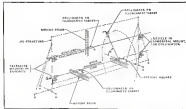
British use of the optical equipment is reported to have been too exacting and slow, requiring also the use of skilled personnel. Republic took this basic equipment and developed accessories for simple, personal application. One unit, the Republic-developed optical positioner, utilizing a light-beam headpiece, holds the jig fixings "in space" and permits accurate alignment in any attitude.

Already Trade-Tooling for the latest version of the Thunderbolt-F-84F—will be set up according to the new scheme.

But this won't be the last application of the system. Republic, though it does not make the equipment on a commercial basis, has made it for Fairchild Engine & Airplane Corp., and for Boeing Airplane Co. for its B-47 tooling program.

Republic has been working on development of the future scheme for about three years under Air Force contract. It has just finished phase 1 of the study—basic evaluation. Cost to date has been about \$175,000. This includes the company's expenditures before contract.

Mass Proving—Now, Republic will cost fixtures for Boeing B-47 and North American F-86 wing, main, Douglas C-124 and main, and Lockheed P-54 fuselage panel. When completed, the fixtures will be disassembled, flown to their respective airframe builders, and re-erected there optically to check



OPTICAL TOOLING scheme showing general principles of method. Two lines of sight are depicted and a third collimation line is shown established by optical square normal to base line. Moving beam accommodates slayer plate for fixture fitting.



TEST FIXTURE with linked assembly cradles for Republic's optical tooling system. Scope and target inside at far end's opposite ends set up base collimation line. Man at right aligns disassembled target-carrying positioner for locating fixture fittings.



LINEAR SPACING of fitting is checked with measuring rod between scope collimator.

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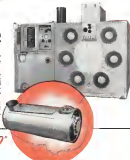


This USAF Type A-1 Unit heats up 6 South Wind "929's" to pre-heat engines, air fuels, cabins, cargo heaters, landing gear, etc.—SIMULTANEOUSLY!

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3. **Easy service accessibility**—quick plug, remote and fuel line assembly readily removable through access port on burner case. No need to remove burner from system for servicing.
4. **Highly simplified design**—adjustable for both "congenial service" and "separate control" air systems.
5. **Case temperature switch**—automatically controls rated temperature of optimum level during operation.

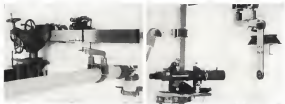
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**AIRCRAFT HEATING
AND THERMAL
ANTI-ICING EQUIPMENT**



FORTIFONER beam collimator and adapter plate with firing target attached. **FITTING LOCATION** is indicated by sighting scope on studs attached. Fitting's extensions project into support structure eyes in bar mounted on firing. Channel supports level. Fitting shown in upper right, lower right under scope without collimator.

flexibility of the procedure:

► **System Area-Here** are the details of the new looking technique, prescribed in a final phase report by Republic's W. J. Augustine and revealed recently at a company meeting attended by representatives of plane builders, Air Force, Navy and Maritime Board.

General objectives of the development program, under the direction of A. Kitzelbauer, Republic's chief of manufacturing research and development, are:

- Reduction in cost of tooling
- Better preparation for emergency production
- Improved accuracy in fixture construction to meet looking requirements for future high-speed planes
- Design of large assembly fixtures transportable in small units by air
- Segmentation in the making of assembly fixtures, to permit quick turning of comparatively unexpensive personnel to build them in an emergency
- Means to permit a jig builder to erect fixtures in a dimensional accuracy allowing interchangeability without need for master fix coordination
- Means for erecting fixtures so that manufacturers (other than aircraft builders) can build specific assembly fixtures without difficulty. For example, it was found that fixture substructures with highly drilled toolholders required considerable time to become familiar with the technique needed for building assembly fixtures parallel to the assembly industry
- How Dura-Base, principle of the optical looking technique is to establish bases of light as reference lines instead of using machined strips, thus reducing the fixture making points with their lines of sight by means of postheating equipment

The basic line of light-collimator line—given by sighting a telescope held on an inclined base at one end of the fixture, with an illuminated target positioned at the opposite end or at an intermediate point of the fixture. Any number of auxiliary "lines" can be established.

Intermediate stations at any spacing are added to the collimation line by intercepting and aligning a collimator (carried on a movable support) with the telescope's line of sight.

Fixture points in a plane normal to the collimator line can be located by substituting an optical square for the collimator.

► **Equipment Used**—The fixture alignment system uses three special instruments and Republic-developed accessories.

- **Internal focusing, Taylor-Hobson telescope**, supported in a ground steel base to give coaxiality with the scope's optical axis.
- **Specialized mounting for scope** to give a universal pivot point for alignment, the line of sight passing through the sphere's center.

A second spherical alignment system



TARGET RETICLE used for alignment with telescope to align collimator line.

for a Taylor-Hobson target reticle, with lens's axial point coincident with sphere's center.

- **Measuring bottom holder on scope's mount**, affording a point for accurate fixed measurements
- **Adjustable bracket (locking)** providing initial vertical and horizontal alignment for scope and target reticle aligning tool
- **Fixed mounting base**, for adjusting spherical mount and adjustable aligning bracket, an adjustable base for vertical adjustment for target alignment
- **Single level for scope and optical square**
- **Aligning tool** for securing off target reticle with line of sight
- **Spacer carrying spherical mount** at each end, to give rapid adjusted setting of mounts for scope and target reticle when establishing multiple collimation lines
- **Universal positioner serving as mount for collimator, optical square, fixture fitting adapter plate and known fixture**, thus providing means for locating four target reticles to established line of sight

Unit is on a movable base and employs a rectangular steel base and adjusting mechanism to give vertical, horizontal and tilt adjustments.

The base is machined to close tolerances and has a series of holes for attaching the fixture fitting adapter plate.

It also carries a Taylor-Hobson collimator mounted on an adjustable base for locating the collimator or optical square in angular relationship to the base.

The collimator efforts illuminated targets, showing tilt and displacement, for locating the fixture fittings in the established collimation line.

The optical square establishes a collimation line in a plane perpendicular to the basic collimation line.

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- Optical extensometer (Taylor-Hobson) attached to scope first, to give higher accuracy in reading displacements
- Fine line etching, fixture fitting locations, by utilizing an etching and etching scope to the accurately located target
- Adhesive plate attached to universal positioner base and connected with calibration line to locate the fixture (design and hold them in alignment while being attached to fixture)
- Fixed mounting block, used on fixture to mount reflector or optical square
- Measuring rod with monometer scale, used with measuring ball on scope and extensometer for quick, exact spacing of fixture fittings
- Fast fixture—for fast tooling development project, Republic built a lot of extra rectangular pattern, with three lower and three upper fixture fittings spaced five feet vertically and horizontally

The fixture incorporated tubing assembled with bolted standard fittings to assure interchangeability of parts, lower cost, use of unskilled labor and rapid knockdown for shipment, none at all. Corings also were used to install bearing, fixture fitting and brackets for alignment of instruments. Thus, all welding was eliminated.

An important consideration in designing this standardized type fixture was that of providing adjustment for positioning the fixture fittings without the use of shims or releasing the previously verified fitting support castings, also, to develop a method for permanent anchoring of positional fittings to their supports with little labor and within dimensional tolerances.

• **Fitting Anchor—Retainer caps** were developed for permanent steel bolts on fixture fitting support castings. These were devised with automatic peening into the open caps. When fittings are correctly positioned, a rubber coating inside cap—center—poured into the caps to anchor the fitting (Republic reports that about 12,000 lb. would be required to break the solidified joint). It says, however, that the material had some cold flow and must be worked, the amount of checking depending upon the consistency of the tool.

• **System Setup—The optical system** applied to the casting assembled test fixture to establish two horizontal collimation lines and fixture alignment is as follows:

- Fixture fitting support castings are assembled on the main structure at predetermined locations. Exact centering of these supports is not necessary.
- The lower shaft for measuring the scope is assembled at a predetermined location on the vertical structure. A similar shaft is installed on the fixture's

opposite end to support the target reticle. The operation is repeated to locate the upper collimation line. The device may be located by side vision, since adjustment is provided on the instrument mounting base.

- **Alignment scope** (in optical mount) and mounting accessories (fixed mount) (rig base and adjustable alignment bracket) are installed on the lower shaft.
- **Target reticle and accessories** are installed on the opposite shaft.
- **Telescope** is leveled with the attitude level and sighted on the illuminated target at lower's opposite end.
- **Target reticle** is aligned with scope by vertical adjustment on attitude mounting base and by adjusting alignment brackets on the scope and reticle, thus establishing the lower collimation line.
- **Next, the second collimation line** is established. An adjustable mounting base is installed on each of the upper shelves. One optical mount of the collimation base is placed on the fixed mounting base of the first collimation line. Then, the spherical mount on the other end of the bar (set at a predetermined spacing) is leveled as the vertically adjustable mounting base for the second collimation line.

The spacer bar is leveled and the upper bar is repeated and locked.

The procedure is repeated for the mounting base on the opposite end of the fixture. This sets the vertical spacing between upper and lower bases and establishes the second collimation line.

• The lower fixture fitting is now located. Scope and target reticle are installed on opposite, lower mounting bases, and line of sight established between the two.

The optical positioner's steel beam is repeated horizontally. Fixture fitting alignment plate is attached to beam through the desired marking holes. Collimator mounting head is installed on positioner beam in correct relation to alignment plate as determined by mounting base. The head may be set against or angularly to the beam. The collimator is then installed and its adjustment set to desired angle.

Fixture fitting is attached to alignment plate via marking head which, having specific dimensional relationship to collimator positioner.

Positioner beam is swung in place, thus projecting the fixture fitting's tubular extension into the reticle's cap attached to the fixture-fitting support.

Using the level on collimator mounting head and the vertical, tilt, angular, and lateral adjustments on the positioner, the collimator may be aligned with the scope's view.

The fitting's base spacing is exactly established by placing the measuring rod between the scope and collimator

New ADEL Lightweight 3000 PSI SOLENOID, PILOT-OPERATED 4-WAY SELECTOR VALVES



New ADEL poppet type selector valve No. 24390

Internal leakage in normal position 1 drop per minute maximum at 3000 psi. When in normal, cylinder lines vented to return. Can be used as a part of separately mountable 3-way valves, 1/4 and 1/2 inch line size.

Weight
2.0 lbs.



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CHARACTERISTICS OF BOTH POPPET AND SLIDE TYPE VALVES:

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- Integral type for protection of pilot valve against effect of dirty oil, foreign particles, etc.
- Continuous duty solenoids, either 1 or 2.
- 4200 psi rated pressure on all ports.
- Pressure drop 20 psi at 6 gpm; 100 psi at 1 gpm.
- Produced for 17-18 mils dia, 10 mils maximum, available for other de val gaps.
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between and adjusting the universal positioner lightly. Collimator concentricity and alignment is established against collimator bar.

Molten Genetrol is poured into the receiver rings as fixture structure. After the material solidifies, the fixture fitting is disconnected from the adapter plate and the fitting is then correctly positioned.

This procedure is repeated for the other two lower fittings in the test fixture.

Wiper before fittings are used is added. Scope and target sticks are placed on upper opposite mounting bases and line of sight established between the two.

Collimator is attached on mounting board for vertical use of probe. Upper fixture fitting is attached to adapter plate, and positioner beam is swung into place vertically, placing fitting support mechanism into receiver rings on fittings. The upper fittings are then located so the upper collimation line at lower fittings will set up.

To project a line of sight around to either line, the aligned collimator is replaced by the optical scope.

To check any fitting location, the scope and target sticks are aligned at the potential collimation line. The checking bar is nullified and locked in the fixture fitting, and the scope sighted on the inside in its check bar to determine fitting alignment.

► **Comparison Made**—To compare cost and characteristics of conventional line fabrication and alignment with the facing and optical method, Republic also built and set up a similar assembly, duplicating it with the usual wire, photo-lath and layout procedure. Support sticks were installed so that the welded structure could be checked for accuracy with the optical device, but fabrication and installation time of these studies was not considered in the comparison.

Total saving with the new method was 45 man-hours (68 for the optical and casting procedure, minus 23 for the conventional method). In the same batch and assembly of detailed parts 54 man-hours were saved, and 94 man-hours in the installation and alignment of fixtures. Another favorable consideration is that certain personnel were so familiar with assembly of the new type structure.

► **Improvements Coming**—The Republic report holds that the optical system showed considerably more accuracy than the conventional procedure. Spacing between the fitting checking points and the respective collimation lines were consistently within .003 in.

Republic also found that in the per-centage test fixture, spacing accuracy between the collimation lines is not as large as with the optical system's positioner because unless great care is

taken in use of the spacer bar to establish the two lines, its weight can cause deflection in the mounting base, plate forms and affect accuracy of settings.

Study shows a guide with to use the universal positioner instead of the spacer bar, and several tests have shown the substitute to be feasible.

Loose spacing of the lower fittings remains consistently accurate within .003-.005 in., whereas spacing for the upper fittings has varying accuracy. However, apparently, for the latter condition is that the weight of the positioner beam on horizontal aspect promotes stability in the set-up, whereas the beam in vertical aspect introduces enough instability to give inconsistent accuracy. Preliminary the beam possibly in both positions, may correct this condition.

Republic believes that because of the accuracy obtained on test fixtures in achieving the fixture checking points by the collimation lines the optical procedure will eliminate the need for master fixtures. Where it is advisable to use masters, these may be aligned more conveniently optically.

To prove that fixtures could be a precision assembly without master tools, Republic technicians independently assembled duplicate fixtures, using standard, bolted castings and Genetrol-sandwiched fittings. Result was that fit line points matched within .002 in.

Republic of the bolted casting fixture, Republic says, appears equal to that of the welded structure normally, and at the plant. This was proved by transporting the aligned test fixture to another plant location and again checking alignment. Fitting checking points on both fixtures were within the original tolerances.

Titanium Welding

Further contribution in titanium technology has been made by the American Welding & Mfg. Co. of Warren, Ohio, with its successful flash butt welding of titanium bar stock.

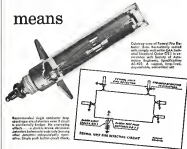
Production runs of aircraft jet engine parts are being accomplished on standard equipment.

The technique involves heating the bars to 2600 F before joining. After forming, the bars are flash butt welded on a 750 kva. welder.

Flash is removed after welding, and the rings are heated again to 1600 F before they are used on equipment. Because of the early oxidation of titanium at temperatures above 1000 F, the operations must be dry.

American Welding has found it possible to machine the rings at surface speeds and feeds greatly in excess of current recommendations. With carbide tools, speeds above 300 fpm, and feed of 0.012 per revolution give an excellent surface finish.

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Utility-Command Craft for Army

Twin-engine transport proposal features small field performance, ruggedness, maintenance ease.

Once upon there is an Army as fast—the aircraft required for ground support are being integrated into an air force for the entire service. The special needs of Army air are expanding a group of new designs—and a sample of one is presented here.

The aircraft is a medium-sized, low-engine, high-wing, conventional tail aircraft with a small, high-wing, conventional tail aircraft. It is a small, high-wing, conventional tail aircraft with a small, high-wing, conventional tail aircraft.

This parallel, then, actual aircraft design position, with the central role position as the final result.

By Max Daggett Jr.

After integrating some ideas to its service, it is a growing feeling among some Army aviation that all Army aircraft should be designed from the ground up to meet Army requirements and that these aircraft should be based on two types of airplanes and a number of types of helicopters.

Design Philosophy. The purpose of this article is to propose a twin-engine utility-command aircraft for the Army, as a companion piece to the Cessna 441. The proposal is based on the assumption that the L-19 and the new twin would be the desirable future of the Army's principal means of taking to the air except for helicopters.

Army aviation is assigned two missions, observation and transportation. Observation is performed from aircraft that have certain design characteristics. In some instances basic requirements for the two missions are so far apart that the necessary capabilities cannot be designed into the same airplane. However, these requirements can be adequately met when the necessary capabilities are properly divided and designed into two airplanes, namely, the L-19 and a hypothetical twin-engine utility-command aircraft.

The latter would be like the L-19 but due to the difference in mission would demonstrate somewhat different capabilities. Such an aircraft should have the following characteristics:

- Good ground stability.
- Reasonable cruising speed with good stability throughout the speed range.
- Good ground and in-flight visibility.
- Service ceiling to accommodate all probable operating terrain.
- Useful load to include five or six personnel with parachutes and full side cargo for a flight of reasonable range.
- Service and maintenance to be accomplished in the field with minimum personnel tools and equipment.
- The right instrument operation capabilities.
- Rugged structure.
- Interchangeability—With the basic characteristics of such an aircraft, known it seems logical to go one step further and specify three additional ones. They are:
 - Both airplanes shall be equipped with the same type powerplants in driving engines and electrical systems.
 - Both airplanes shall be equipped with

Specifications

| Characteristics | All model |
|--|---------------------|
| Propulsion | |
| 2 Continental R-1190 engines with McClellay headpills | |
| Gross weight | 4100 lb |
| Empty weight | 2950 lb |
| Useful load | 1150 lb |
| (1) Five occupants plus 200 lb. bag gear or auxiliary fuel | |
| (2) Six occupants plus no baggage or auxiliary fuel | |
| (3) Pilot and fuel filler only plus auxiliary, baggage or auxiliary fuel | |
| (4) Pilot plus a combination of fuel and cargo up to a total of 1450 lb | |
| Wing span | 46' 0" |
| Length | 30' 7" |
| Height | 14' 1" |
| Stalling speed | 10 mph (14 knots) |
| Cruising speed | 77-115 mph |
| Maximum speed | 158 mph (140 knots) |
| Normal speed | 617 mph (140 knots) |
| Range with auxiliary fuel | 921 mi (1313 knots) |
| Rate of climb, best altitude | 1300' /min |
| Service ceiling | 17,000' |
| Turn rate | 180° in 30 seconds |

*It is assumed that the minimum useful load is 1000 lb. The Air Force or Army specification will be revised.

propellers which under present conditions could be interchanged.

Both airplanes shall utilize as many of the same standard parts and accessories as possible including wheels, instruments, radios, lights, interior fixtures, and control components.

There are of course both advantages and disadvantages in increasing these items into the aviation equipment group, but properly planned and executed, the advantages should be outweighed by the disadvantages. Imagine the simplification in parts handling, planning, carrying, storing, shipping, making, installing, servicing, and overhauling. As a disadvantage, performance of the twin-engine airplane would not be affected by an engine failure or loss of engine. The L-19 is already designed and its production interchangeability could not be carried out to the fullest extent.

While thinking of standardization of components and basic design features, it is also necessary to consider previous facts.

- Self-sealing fuel and oil tanks.
- Aerial ice detectors and tail ports.
- Design for high altitude operations.
- Wire-reinforced fuselage in the event of aerial or desert operations.
- Catapult takeoffs and arrested landings.
- Towing by heavier aircraft.

With alternate interior arrangements the same base two-engine airplane could be used for personnel transport, medical evacuation, light cargo or aerial command vehicle for regular head-quarters personnel. Capable of using many of the same landing areas as the L-19, the new model could be stored and maintained alongside the L-19 with minimum additional tools and parts.

Design Solution. One of several possible solutions to the design problem is shown in the accompanying layout. Since the twin is designed to operate with the field army away from elaborate ground facilities, its structure is heavier than usual. Consequently, a smaller portion of the gross weight is available as useful load when compared to commercial airplanes of the same size and type.

The cabin interior can be arranged to handle a variety of tasks, and extra baggage is available when flights of greater than normal range are required. With the cabin set up as a personnel transport, the four seat seats line to the rear and allow maximum protection against crash injury. Any or all the seats can be fixed forward for special missions.

When geared for evacuation of casualties from forward areas, the cabin is loaded and unloaded through the fore legs landing which carries any ambulatory. The main hatch is used for unloading cargo and may be used for ground loading and unloading of cargo if necessary. Alternate exits from the forward part of the cabin can be opened through the hatch above the side door or in the rear fuselage.

Performance Considerations. While the performance predicted is based on conservative estimates, the cruising speed seems low when compared to commercial airplanes of the same size and type. One reason for this is that the twin, like the L-19, uses a propeller designed for takeoff rather than cruise. The advantages of interchangeability and short takeoff for the twin should outweigh the disadvantages of a lower cruising speed as far as Army needs are concerned.

At the other end of the speed range, the low stalling speed and good "climb out" characteristics make the twin available for use in forward areas where normally only low capacity aircraft have operated.

This design embodies construction, equipment and features which are now available on present Army use in the aircraft industry. While certain parts of the proposal may seem extreme, the basic rationale of it is that only with airplanes designed specifically to meet Army requirements can Army aviation get the best results. Anything less than the best must not be tolerated.

Criticism . . .

In general, Daggett's proposal makes good sense: the design has been carefully worked out around the specific requirements which it must be called for. However, assuming the Army would feel the same way, the proposal faces a substantial story design solution.

But no designer can let the opportunity to construct and build one by. Here are some specific complaints.

Why Taper? With as much of the wing as a constant chord section, there must be great in using the small amount of plan taper in the outer panels. This is a main wing rib and skin being, which is expensive.

By the same token, there seems to be no reason for a wing tapered to diamond root, either.

Giving this a point further, it is not desirable to taper the tail surfaces in thickness and plan. The vertical and horizontal stabilizers could be of identical geometry, section and thickness into, with the basic construction and being the forward construction. Two of these would be better together for the horizontal surface.

Fuselage Overweight. At position of the fuselage is not enough except to hold on the tail. Both a deep interior appears unnecessary and therefore overweight. How about putting the oil in a boom and leaving a big. Pocket like opening in the rear of the cabin for easy loading?



All of these suggestions have been incorporated in the modified drawing. Basic dimensions and weights remain the same, although the pounds saved in converting the fuselage to the boom type should counterbalance the pounds lost in going to constant-chord and thicker wing and tail sections. The search is continuing in design—David A. Anderson.

and Reply . . .

There are comments of objection to my several design problems, and I naturally prefer to stick with my original proposal. But the points which have been brought to my attention are well considered and my comments follow.

- **Why Taper?** Tapering the wing outer panels is a plan and thickness.
- **Position of the fuselage** is a plan and thickness.
- **Interchangeability** is a plan and thickness.
- **Interchangeability** is a plan and thickness.

In addition, the wing has built-in twist which, with the fixed ribs, allows the center section to stall first. This is important for aileron effectiveness throughout the stall.

The point in design and production is a question I don't see. If it were not for the reason stated above, I'd say constant chord and thickness for Good stability and control around the stall is the requirement. I am assuming that the point can't be considered merely. Let suppose we compress and taper the thick area in the outer panel only rather than from the middle out, and know the plan taper as shown.

Anderson says the point about tail section taper. Constant chord and thickness for interchangeability reasons should be the rule. But a small taper would be needed for the vertical surface.

Fuselage Overweight. The rear fuselage, in addition to holding on the tail, provides space for radio, radar gear or auxiliary fuel. How about putting the oil in a boom and leaving a big. Pocket like opening in the rear of the cabin for easy loading?

The bottom fuselage hatch is used and located in handle loading and unloading of cargo. True, it can be altered through a clam shell door, but let's leave it.

As to down wings with the airplane in a stalled landing attitude, the line of sight over the nose section with the ground surface about 14 plane lengths ahead of the nose of the plane.

I did not estimate for single engine performance. For a preliminary design, it should be sufficient to say that if the plane cruises at 120 mph, on 17.5 percent of the power, it will get along at night on less than 100 percent of the power than one engine. Good stability and control in beyond the scope of a preliminary design—Max Daggett Jr.



(Lima Tumbes Airport is an American flag project.)

A Good Sign to Fly to...

Lima Tumbes Airport handles the large volume of air traffic to and from Lima, Peru. Here as around the world, aircraft owners and operators depend on Esso Aviation Products—products that are constantly being improved by research and development to keep pace with and even anticipate the changing requirements of modern aviation. The Esso winged oval symbolizes petroleum products of uniform, controlled quality backed by more than 40 years of aviation experience.



*At Lima Tumbes Airport and throughout Peru and Ecuador the members of Esso Aviation Products in the International Petroleum Company Ltd.

America's Road to Victory

... Let's Increase Production

This is the time to speak out—now—at the beginning. Our industrial program for re-armament is getting off on the wrong foot.

The talking and writing about it emphasize the wrong things.

Its headline words are "cuts" and "controls."

These words make bad propaganda for the cold war.

"Cuts" and "controls" are no words to challenge the imagination and energy of our own people. They won't impress the routers of the Kremlin. And they can only make it appear to the rest of the world that America thinks it can defend the free way of life by abandoning it.

America stands as the world's champion against aggression because America has become the most powerful free nation in the world.

How did we get that way?

Not by putting ceilings on wages, not by retreating or changing sound government controls all over business and industry.

To be sure, some temporary controls are necessary to channel very scarce materials speedily to use for defense. So, too, are special taxes and credit restrictions needed to combat inflation. But they will be fatal if they blind us to the fact:

We become the strongest nation in the world by out-producing every other nation.

Production—The Final Answer

Next year our government is planning at least a \$40 billion military program. Instead of planning only on controls to divert \$40 billion of production from the making of civilian goods to the making of military supplies, we should be figuring out also ways to push up total production.

Of course, our industrial plant is running at close to "capacity" now. And our labor force has reached almost full employment. There isn't much slack to be taken up.

Can even the United States add a \$40 billion margin of production on top of what it is already doing?

Our answer is "Yes"—and within two years. It can be done by adding about \$4 billion each year to our program of capital investment which now runs about \$12 billion a year.

Part of this added production will come from expanding our industries. The steel companies, for example, already have plans to increase their capacity about ten per cent in the next two years.

But by far the largest part of that \$40 billion of added production must come from higher productivity—raising industry's efficiency.

Continued on next page

To meet our goals we need to raise our productivity five per cent a year.
Can it be done?
The answer is an emphatic "Yes!"

Raise Industry's Productivity

McGraw-Hill's studies of industry's equipment show that there are countless opportunities for improving efficiency. Our manufacturing industries alone need at least \$35 billion of new equipment to raise their facilities to first class technical standards.

Here are some of the broad possibilities reported by the trained editors of McGraw-Hill's business magazines:

In many manufacturing plants as much as 40 per cent of workers' time goes into moving materials and parts—shuttling things about within the plant between processes and to and from shipping platforms.

FACTORY estimates that improved materials handling equipment and methods might well cut handling costs twenty-five per cent and save annually over \$35,000 man-years of unnecessary labor.

Modern machine tools designed since World War II are 40 per cent more productive, on the average, than is old equipment. But AMERICAN MACHINERY surveys show that 95 per cent of industry's machine tools are of designs at least ten years old. Replacing them could raise productivity of the metalworking industries at least ten per cent—enough to absorb a major share of the metalworking industries' part of the defense program as now planned.

In coal mining, latest equipment and methods can raise productivity sharply. The editors of COAL AGE estimate that production of bituminous coal could be raised from seven tons per man-shift to ten within three to five years.

Many new textile production techniques are 50 per cent to 75 per cent more efficient than those in use now. If plants could be fully modernized, and full use made of latest management methods, TEXTILE WORLD estimates that output-per-man-hour would rise 30 per cent. A FOOD INDUSTRIES study indicates that modern equipment plus the best management techniques could raise productivity in food processing at least 20 per cent.

These are just some of the opportunities that industry can seize and by which the nation can profit.

A Nation-Wide Effort

Of course, industry itself can't do the whole job. Labor, government and all the rest of us must cooperate.

Government's part is to see that its emergency controls are so applied that they will increase productivity and thus make possible an early lifting of such controls.

Labor's part is to help in the development of labor-saving methods and machinery and to welcome their adoption as the only sure way of continuing to advance the American standard of living while maintaining the American free way of life.

For all of us the job is to work constantly for an expanding, even-stronger America with constantly growing productivity; not a pinched and shackled America clogged up under wage and price ceilings and tied to a ration card.

Challenge to Industry

Here is a sharp challenge to industry to study the best work-methods that are being reported—to use every minute and every dollar it can to replace obsolete equipment.

Here is a sharp challenge to government to do everything within its power to make its control policies and its fiscal policies strengthen the incentives to industrial modernization—to demand sacrifice for a purpose and not for effect.

The job to which such opportunities point will take time—though nothing holds back adoption of some of the simpler improvements in work-methods reported in business magazines all the time.

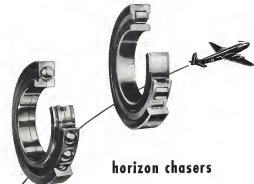
But increasing production is our one best hope that we may be spared the full array of peace, wage and production controls now and be freed eventually from all controls.

General Omar Bradley has said that the protection of our national independence calls for "long-range commitments that we are willing to carry out."

A long-range commitment to fight this battle for peace with America's most powerful weapon—industrial productivity—is the surest guarantee of victory for the free world.

Let's make that commitment now—at the beginning.

McGraw-Hill Publishing Co., Inc.



horizon chasers



Day in, day out, the aviation industry pushes back the horizon . . . develops safer aircraft with speeds that outrun sound . . . with cruising ranges that make circling the globe just another milk run. And in these modern planes . . . whether they're fighter jets or high-speed commercial liners . . . every fastening part must take a terrific beating . . . must withstand the punishment of greatly elevated

temperatures and high relative speeds. SKF keeps pace with the steady march of aviation progress . . . through constant research and cooperation is able to supply the right ball and roller bearings for the task at hand . . . bearings produced under a system of rigid controls that insures consistently uniform dependability.

SKF Industries, Inc., Philadelphia, Pa.

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MOBILIZED, FOR PEACE OR WAR



BRING READY to aid the military forces is nothing new for the scheduled air carriers; to them it is only a matter of degree. Constantly we are becoming better prepared to provide the air transport element of National Air Power.

It is a matter of great pride that we of American Airlines, Inc. participated in the Hump Operation, over the Himalaya Mountains, from India to China; in the Berlin Airlift; and, more lately, in the Korean Air-

lift. That experience and the tremendous capabilities of American Airlines, Inc. are and always will be available, for the important and difficult tasks ahead.

More than \$15,000,000 is now being expended by American Airlines, Inc. for new and better aircraft. In the Spring there will be a new fleet of larger and faster flagships; to provide service for your requirements in time of peace and prepared to fulfill other obligations in time of emergency.

AMERICA'S LEADING AIRLINE **AMERICAN AIRLINES** INC.

EQUIPMENT



ROUND THE WORLD system of radio telephone communication, recently completed by PAA is indicated by lines on this map.

PAA Radio Telephone Girdles the Globe

Special equipment designed for job the experts said couldn't be done because of varied technical problems.

By George L. Christian

Pan American World Airways is "going out of the telegraph business." Captain W. Waldo Lynd, the airline's communications superintendent, who recently announced that Pan Am had completed the first round-the-world voice radio telephone system, told AVIATION WEEK that his company will completely discontinue wireless telegraph as a means of air-to-ground communication by next spring.

Lynd said the three primary advantages of radio telephone are: speed of communication, more obviously being much faster than Morse code; accuracy of message, since the Captain receives message directly rerouted through a third person; and volume of information. RT is so much faster that much more comprehensive reports may be sent to the pilot.

As radio telephone comes to radio operation (in the plane) go out, the pilot knowing his own operator. Most radio men have found other jobs in the company, with Acrometrical Radio, Inc., or radio equipment manufacturers, PAA claims.

Although Pan Am does currently have radio telephone circuits girdling the globe, pilots flying these spots still have to depend on dot-dash telegraphy.

- Naah, Fiji Islands to Auckland, New Zealand
- Manila, P. I. to Singapore
- Accra, Gold Coast to Johannesburg,

Union of South Africa.

But these last links will be converted to RT within the next few months. When that is done, 100 percent of the airline's routes will be radio telephones equipped and the efficiency of air-ground communications will be immeasurably increased, Pan Am says. Total cost of the system was estimated at \$5 million.

► Skipton Ended—The last link in the

19,687-mile voice radio path around the world, the Bush-Kanichi New Delhi segment, was activated Nov. 12.

Establishment of the network, which currently comprises 32 high-frequency ground radio stations spaced across 16 continents and islands, was no easy job. There were the technical experts who said that radio telephone could never be used successfully for air-ground communications because there would inevitably be times when a plane would be out of contact with a ground station because it was either too near or too far away. Or sea spots or other natural



CIBART gives each captain before flight helps find frequency to use



RADIO TELEPHONE installation at Maricao. Left: person shows operating position with RT operator's station at left, point-to-point Middle first and Morse teletype at right. Two Collins two channel transmitters in remote location are shown as photo at the right.

phonicians would interfere and wipe out the RT voice links they said.

Then there was the language problem. Would it be possible to train natives in such places as Okinawa or Pao to operate the stations and speak English to the pilots? Lynch and his staff, in 1944, set about to prove his point.

He related that RT would never be a satisfactory or acceptable means of air-ground communication unless the ground stations were located, and the transmitters located and identified in such a manner that a plane went inevitably be in contact with one station.

Finally of Frequencies—By carefully selecting the geographic location of each station, and by establishing a hierarchy of frequencies, Pan Am was able to assure its pilots of continuous RT contact with the ground.

One station per geographic area is designated as a "control" station, the others operate as "outgoing" stations. Should circumstances require, the "control" station may be changed at any time. All air-ground contact is made with whichever station is in control.

To enable a pilot to find what frequency to use for optimum RT contact at any time, at any spot on Pan Am's route, propagation charts have been prepared (see cut) and are given to each captain before operating a flight. He draws a line from the left hand margin of the page to the right in accordance with the RTD and RTA shown on his flight plan. This line, by intersecting a frequency line, tells the pilot immediately which frequency he should use.

To cope with the large number of frequencies used on the worldwide system, the crystal koken in the airborne transmitters are quickly removable. A holder mounting 28 crystals is situated at the origin of a flight according to the frequencies for the first leg of the trip. At a designated base station, these are removed and replaced with 28 other crystals to enable the

passengers for the second leg of the flight, the process being repeated to destination.

144-Frequency Receiver—Lynch said that Pan Am has designed a multi-channel receiver that accommodates 144 frequencies. The set, only a few of which are yet in use, is being built by Acoustical Equipment Co., Miami.

The airline is also working in cooperation with Avco to develop a compression transmitter. When this is done Lynch feels that the extreme equipment will be able to cope with any communications problems which will come up in the foreseeable future.

Establishment of Pan Am's round the world radio telephone started in a modest way. The Civil Aeronautics Administration first authorized the airline to use RT on its Miami-Nassau and Miami-Havana routes. This was in October, 1944.

Before long ground stations were required for these first RT stations. They spoke English over the air-ground circuits to the pilots and Spanish on the point-to-point lines.

The inquiry with which the RT links commenced along Pan Am's routes could be a mixture of the use of the system. By the end of 1947, RT communications existed along the company's South American routes as far south as Buenos Aires, then crossed the Caribbean and Central America north of Brownsville, stretched north from New York to Canada, and on all of Pan Am's Atlantic routes.

Long Distance Over Water—Significant milestone reached in 1948 was the establishment of the first long over-water voice channel—New York-San Juan. The results were so satisfying that PAA decided that radio telephone could be used on the entire system.

With the development of RT between the West Coast and Honolulu in 1949, the frequencies, which had started at 6, 8 and 10 megacycles, also

for the first time went up as high as 18 mc, Lynch said. With these new frequencies, trans-Pacific operations were able to cope with the long distances between ground stations and aircraft.

World Circle—Lynch's "unplanned" dream came true in 1950 when PAA had its radio telephone loop around the world. In quick succession RT stations were put into operation across the North Atlantic from New York to London, then across Europe and the Middle East to Rome.

The Pacific segment at Honolulu was pushed westward to Tokyo and Manila, which was quickly linked to New Delhi via Columbia and Hong Kong. Then, on Nov. 17, the last part was closed with the establishment of RT from Rome to New Delhi.

Lynch readily conceded that his company could never have achieved its goal without the active cooperation of Avco, other international airlines, radio equipment manufacturers and interested government agencies in the U.S. and foreign countries.

For instance, Northwest Airlines and United were active in RT development in the Pacific as was the CAA while Trans World Airline and American Overseas Airlines assisted in RT establishment in Europe.

Among the equipment manufacturers whose assistance facilitated the expansion of Pan Am's radio telephone circuit in Collins, whose equipment is used exclusively on the airline's Pacific Atlantic and Latin American Division aircraft. Collins' transmitter sets are made by Federal, Bendix, Maxson, Wilson, Collins, ACFE and others.

The important part, according to Lynch, is that radio telephone has been proved to be an acceptable means of air-ground communications, that it is as reliable as proofing systems and, because of its speed and simplicity of operation, greatly increases the information available to the pilot.

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NEW AVIATION PRODUCTS

Eases Aluminum Soldering Problems

Easier, more efficient soldering of aluminum alloys is promoted with the development by a British firm of a soldering "blowdown" soldering iron.

The device, consisting mainly of a gun mounting a removable copper bit and a magnetron-driven transformer, reportedly holds one of the major problems of aluminum soldering. That is, the presence of oxide films which strongly resist on aluminum surfaces and reduce adhesion of solder to metal difficult.

In this unit, rapid vibration, so minute it does not affect operator or his work, is used to break up continuously these highly refractory films while solder is being applied.

According to information gathered by our correspondents in England, the unit is the first of its kind to be marketed commercially. It was developed by the Electronics Department division of Mullard Electronic Products, Ltd., London.

With its capacity of making positive, clean and uniform joints efficiently on soldered aluminum parts, the new iron is expected by its maker to prove of value to the aircraft industry.

It is designed to eliminate the use of fluxes, normally employed to drive off oxide films. Once a good liquid contact has been established between bit and work, a solid, smooth joint easily can be obtained, says the company. The iron is used in the same manner as conventional equipment and will permit use of soft solder. To avoid electrolytic action, the firm suggests possible advantages in the use of tin-lead instead of the usual tin-lead base solder.

The heart of the equipment is the aluminum transformer which, under use of "toughened" magnetron-driven light discharge tubes which occur in ferromagnetic materials when placed in a magnetic field—to create rapid vibration in the soldering tip. To be effective, the magnetron-driven effect is magnified in the transformer by exciting the ferromagnetic element at its natural frequency. In this transformer, the frequency ranges from 19.5 to 21kc, depending on temperature and intensity of the magnetic field.

The frequency range is well above the normal audible range so no discomfort is experienced by the operator when using the unit for the first time.

Power is supplied through an electronic amplifier. This unit is equipped with handles and has a single control for amplifier switch. It operates on

100 to 250, v., ac., 40-60c. current, has a total power consumption of 120 watts. The power supply has maximum 5 x 18 x 12 in. and weighs 40 lb. The gun weighs 2 lb. and measures 2 x 7 x 10 in. Address: Shiffrinbury Ave., WC2, London.



Radar Tester

A new signal generator for maintenance at superhigh frequencies is being marketed by Hewlett-Packard Co., Palo Alto, Calif.

The instrument, Model 688A SHF, offers continuous coverage of frequencies from 580 to 7500 megacycles and is designed so that all frequencies can be read on a large control tuning dial. The unit is accurate to 1 of one percent, the maker says.

It provides a one watt output signal into a 50 ohm coaxial load at zero decibels gain. It is equipped with an output attenuator reducing output level to less than -100 dbm. Repetitive voltage tracks automatically.

The signal generator may be externally frequency modulated with a sinusoidal frequency of 10 mc. or may be externally pulse modulated with a positive or negative peak voltage of about 17v. Internal square wave modulation also is provided within the frequency range of 400 to 1000 cps. The unit is priced at \$2750.14. 151 Page M41 Road, Palo Alto, Calif.



New Slope Receivers

Gallies Radio Co. has received its first order from airlines for its newly developed glide slope receiver.

The largest is a fleet order totaling \$49,995 for three sets placed by Trans World Airlines, the Cedar Rapids firm reports. Delta Airlines also has ordered Gallies glide slope equipment for its entire fleet and its plans, says the company. First deliveries of these improved sets, Model SIV-C, glide slope receivers, are scheduled for next March.

Up to now, airlines have depended on Raytheon R-55R/ARNC receivers used by the Army Air Force in World War II. This model has only four channels, compared to 20 in the new Gallies unit. Among other improvements listed by the radio firm for its set are "considerably" greater sensitivity and higher stability.

ALSO ON THE MARKET

Cockpit windshield sticks to windshield without use of tape, position cups or other means of attachment. Self-adjusting shade pops off and can be folded when not in use, leaves no residue on windshield surface. Made by American Pilot Products, PO Box 41, Orange, N. J.

For compact electronic automation, a universal drum has been developed that can be used with many mechanisms, pulse and flip flop circuits, timing computers and similar devices. Chassis sized specification ANE-19, can carry up to eight instruments total. Made by Avco Instrument Corp., 121 E. 24 St., New York 10.

Cut-out couplings are designed to shut off power when over load from any cause occurs and to reset automatically. With working ranges from 30 to 16,000 lb., unique, they can be used with machine tools, conveyors and other industrial machinery. Made by Anchor Steel & Concrete Co., 6906 Kingley Ave., Dearborn, Mich.

Small transformer welder with 200 amp., 70 percent duty cycle NEMA rating for intermittent but still useful work. Solid state duty cycle magnetic switch that has no open contact. Silicone insulated unit is easily constructed, permits use of 1/8 to 1/16 in. electrode. Made by Air Electronics Co., Inc., 60 E. 42 St., New York 17.

"Microcarb" control for use with heat-treating furnaces permits operation in vacuum and neutral carbon potential of furnace atmosphere directly in terms of percent carbon, for surface and homogeneous carburizing, carbon re-hardening hardening and annealing of steel. Made by Lehigh & Northrup Co., 4914 Stanton Ave., Philadelphia.



...GREATER THAN THE EYE CAN SEE

Flying a tight formation of speeds as fast as sound calls for extreme precision on the part of today's jet pilot. But in jet flying there is more precision than meets the eye. For instance, bearing is precision up to rates as high as 40,000 RPM requires bearing tolerances measured in millionths of an inch. (2) Better bearings—because they are the finest precision bearing made—are used by nearly all manufacturers of jet aircraft engines. Pratt & Whitney, General Electric, Westinghouse, Allison, etc.—all have found Bower bearings thoroughly capable of standing the enormous speeds and temperatures so common to jet engine operation. New materials pioneered largely by Bower have proved more than equal to temperatures up to 400° F. And these bearings operate with complete efficiency as a "lubrication free" lubricant. This is an excellent example of the high performance of Bower bearings in the aviation industry—bearings that are outstanding for precision, durability and quality.

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LETTERS

ATS Position

In a bid to keep the record straight, the Washington, Kentucky, press captured "CIA Pilot Training" in Air Force Week's issue of Nov. 16. It was the first time the facts and confusions on several points. For the past year, "Aerospace Training Society" is a real legislative entity up to \$10 million pilot program under CIA authority. As they learn, Congress, established by Senate House bill and Representative Robert Carson. The fact is, ATS has never voted whether it lives or expires this bill. The point creates the impression that ATS members are out to win a CIA pilot training program. It does into several programs which "both the public and confidants" of the program would either support directly with the Navy and Air Force.

The fact is that S4166 is not a CIA bill, although as ATS Chairman stating the bill was informed that CIA's legal counsel "last some impression" and in checking the bill at the status of its open end. The bill is submitted to the "Technical staffs and technicians." While ATS has taken no position on this legislation since the end of the position, however, the writer, believes that as a basis of recognition such as new, no legislative program not listed directly to military requirements and policies is up to receive much attention from Congress. Since today's emphasis is on military needs, it would appear that any legislation now should include training of

crews and other military personnel, not civilian only.

As in the statement that ATS members would either contact directly with the Navy and Air Force the fact is that our members during World War II conducted training of several hundred thousands of pilots and technicians under the CPT and WTS programs under CIA management. They also trained about a similar number of pilots for the Air Force. We have wanted and will continue to work cheerfully and in cooperation with other CIA as the Armed Forces on any program in the national interest. Even today, military member needs don't exactly vary from any foreign program. When Senate bill S4166 which would extend flight training to Air ROTC participants and as a long way toward solving the long range reserve officer placement problem of the world service. It has lagged although its enactment has been reported by the armed services and as desired by a top committee of education which includes men like Eisenhower, Stennis and Spark, after study of the individuals who have shown it as the military industry. What a model a legislation that will not be met with military requirements for training and do it at a cost that will give the pilot a 30% ATS people change have supported anything that meets those tests and is a long range source of good for the small agencies and the aviation industry.

WANN WILLIAMS, President
Aerospace Training Society
1115 Connecticut Avenue, N.W.
Washington, D.C.



Aerocar & Finance

The enclosed photos show the Aerocar in some new settings. We are continuing our development work on a vehicle scale. With the current technological situation, we are finding it difficult to raise production costs. To test that, as a counterbalance, we have found it impossible. We do have some facts of endorsement at the stage of a request from CIA for the use of the first 10 aircraft on a base near Mendenhall, the one at being operated every day and we now have the help well needed. You will probably derive a new look in the details, and the fact has

been several ones. Still, we maintain ability and interest and now in our hands.

We have a contract, and we have the facility to build the Aerocar. We are now going along with a very informal staff and we are going to be moving to our finance problem. There is certainly nothing wrong with aviation, or the aircraft as it. Some of these days the right machine is going to hit the industry. We only have it. At this time, the 10 aircraft in the hands of CIA would do a lot to show the public that a practical means of flying is available.

MOOREHEAD B. TAYLOR, President
Aerocar, Inc.
Longview, Wash.

First to Korea

The Oakland Tribune goes credit to Transcon Air Lines for sending the first commercial flight plane to Korea for the Air Force. Compare with your Air Force Week accounts of Oct. 6 and Oct. 16 (space credit to Southern & Western).

Southern & Western, Air Force Week, and MATS, Washington, D.C., should all check the operational records at Pacific Basin AFB, where the first flight for the Korea route originated.

WILLIAM R. CHANDLER, Transcon Air Lines, 1401 Valencia Place, Oakland 6, Calif.

The reference quoted an official statement from MATS at Andrews AFB, Wash., to the effect that a Southern & Western DC-4 "was the first commercial airplane to take off in the context with our Pacific to Korea."

Mr. Chandler's letter, we requested and received the following information from Transcon's headquarters:

Travel on the route from the Oakland Tribune, on the day after flight.

The information is correct. Our contract with the military was for the emergency of a Korean deployed Pacific AFB at 6:30 AM, June 15, 1950. A second flight was in the way of the first. This flight was from the Transcon's service of the U.S. Air Force and not by MATS. The MATS contract was not activated until June 16, four days later.

By way of background on this flight, I noted that Farthing in the Pacific on June 20 and advised Transcon's location, and we told it that time that is not without had developed which required the service of civilian aircraft.

Ken Spence, Transcon's Washington representative, and I then made a few other calls and returned to my Washington office the day after the flight. The MATS office requesting information as to how into we could operate then shortly after in Japan. We set the trip up immediately and, as indicated above, the first flight was limited and as it was the end of the month. In the meantime for MATS, his program was set up, initially under Gen. Farthing. I understood and then later that was transferred to Gen. Kane and MATS. Our first aircraft was actually in the way back from Japan but in the first available MATS M1 flight got underway.

DAVID M. NEWSON, President
Transcon Air Lines
Oakland Municipal Airport
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AVIATION WEEK, December 11, 1950

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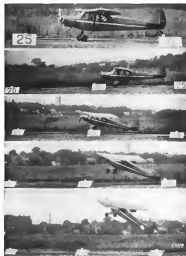
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SALES & SERVICE



STEADY TAKEOFF of Super Cub 125 is 44 mph. Road is shown in sequence views.

New Super Cubs in 1951 Piper Line

The new Super Cubs for 1951 show the effort made by Piper engineers to increase the modern Cub's popularity as a rugged, high-performance all-around workhorse that its dealer can push as a personal plane, trainer, agricultural or industrial machine. Two models are coming off the Jack Haven, Pa., assembly line—the 95 with a 90-hp. Continental, and the 135 powered by a 125-hp. Loosening. Both are finished in the new hygienic plastic base Denalac which provides longer finish life and has nondescript qualities. Basic price for the 125 is \$3,895 and for the 95, \$3,295.

► **Performance** — The model C-125 (5100 extra) 125 is the star performer of the Super Cub series, getting off at gross weight of 1,800 lb. in about 50 ft. over a 50 ft. barrier. Normal takeoff run at that weight will take 230 ft., and rate of climb is 1,000 fpm. At 75 percent power it cruises at 110 mph, and has a top speed of 125 mph. Landings can be made within 190 ft. with full load. By putting the flaps down it can be flown at 55 mph.

Under new provisions in Part 8 of CAA, the plane can land 1,000 lb. of equipment in dry—more than its own empty weight. With this load it

grosses 2,000 lb. and can get off in 125 ft.—in as 95 ft. over a 50 ft. obstacle.

The 90-hp. model prop version cruises at 900 rpm and has a top speed of 112. It can get off in 100 ft. and climb at 710 fpm. Both models can be fitted with the Whittier engine wheel landing gear introduced an last year's planes, and both are approved for Edo 1,900 floats.

► **Interior Makeups**—Dual stick controls and dual hydraulic brakes are supplied at standard equipment. Planes having optional electrical systems have the ammeter, circuit breaker and switches located on the right side of the center section. Rear seats are quickly removable, which gives 15 sq. ft. of cargo area.

CAA Readies New Airman Certificate

A new photostatic copy system's introduction about the size of an auto driver's permit is being proposed by CAA, as replacement for the old bulky certificates earned by pilots, mechanics, instructors, traffic controllers and other aviation personnel.

First of the new certificates have already been mailed out to CAA employees, replacing their old legible 1949's in certificates. The new style permit measures 3-1/2 by 5-1/2 in.

The new-style individualism will go out for all of the 618,449 certificates now held at CAA, and all new certificates issued hereafter will be of this type.

A simplified application form which accommodates an alternate additional ratings as they are received, makes the new style certificate possible. Two photostatic negatives are made of the applicant, one held in CAA permit card system, and the other given to the photostatic shop for a positive copy to be mailed to the certificate holder. Seal of the Department of Commerce is incorporated in the certificate in such a way as to make counterfeiting virtually impossible, CAA states.

Compled with a proposed new CAA requirement that the certificate holder must make a brief report to CAA on his active status every two years, the new system is expected to give CAA a far more accurate picture than it has at present of how many certificates are active.

Under the present system, CAA is unable from its records of certificate holders only persons whose deaths are reported in aircraft accidents, or who have their certificates revoked. Persons dying from other causes, and others not involved in aviation, are not yet listed as active almanac.

AIR TRANSPORT

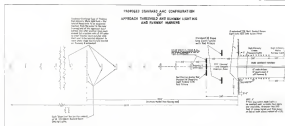
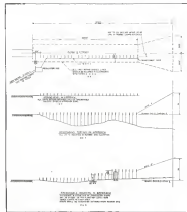


FIGURE 1: IDEAS of what approach light system should be centered, a row of lights with transverse bar 1000 ft. from the threshold.

The Way Out of Approach Light Gloom?



CAAS NEW IDEA is single row of lights on left-hand side of approach zone

Centerline row now has growing support, but AF still objects.

By F. Lee Wooten

A standard approach light system acceptable to both domestic and international airports, and to civilian pilots and the military, may not be as far off as current disagreement would make it appear. There has been a break in the fog that has surrounded approach light development for three years.

The centerline approach light system now has strong backing from a working group of international experts—the Flight Technical Group of the International Air Transport Association. And they have recommended one standard system that already has a strong following—especially among the pilots who must use it.

► **Problem of Shape**—The problem is this: In what pattern should airports lay out lights on the ground the last half-mile before the runway? In bad weather, a pilot needs some kind of lighting pattern to guide him down from the time he usually starts looking out the window instead of exclusively at his instruments. This point is generally at altitude of about 300 ft., distance about 3500-4000 ft. from the runway. This is because it is best to be alerted on contact flight before the last accurate check of altitude and heading. (ILS clearance can bring a plane

CAAS OLD IDEA was slaphdash with transverse bar indicating distance.

down to the flare-out, but it is not generally adequate for final approach except in emergency.)

We've had plenty of high-intensity lights available for years, but pilots, aircraft and government officials have not agreed on how to spread them on the ground. Heaviest opinions and light test conclusions have clashed like hot and cold air masses. One scolding storm after another has swept across the traffic-control scene, more crazing brilliant sharp acoustics.

► **Too Many Answers**—Here are three basic "configurations" that have been proposed to solve the approach light problem.

► **One line down the center.** This "centerline" system is standard in Great Britain. And is the U.S. the Air Line Pilot's Ass. favors it.

► **One line on the left.** The Civil Aeronautics Administration is putting this "left-hand-row" system in at most big airports now. It is a "tadpole" it has extending the left-hand row of runway lights.

► **Arrival of two lines.** CAA started with the "V-glide" system, but pilots reject it, mainly because of optical illusions. The slope of the two lines of bars is designed to indicate descending glide path.

► **Hard to Choose**—All three systems have good points and bad. That's why people can argue the question forever. Also, flight test and ground study up until this year have been inadequate for gathering conclusive evidence.

"Maybe this year is an expert on approach lights," says Air Navigation Development Board Research Director Douglas Ewing. ANOB takes over ap-



CAASBRI'S OLD IDEA was centerline with five transverse bars

CAASBRI'S NEW IDEA, being work in Britain, has only three centerline



AF IDEA is that best of pilots for combination of slaphdash or centerline, such as tested at Austin coordinate "tadpole" for pilots with slugged takeoff

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pilot must fly past to the side of the obstacle.

► **Shoosnaping**—Basic shortcomings of the contraption and all other systems except perhaps the doppler is that it does not give the pilot an accurate descending glide path. However, the instrument pilot, even if he's stale, should surely be able to establish and keep a good glide in accordance with the rate of descent required.

On the contraindication, the pilot corrects and observes his glide angle by the radar, as he'll all the time saving under him. He observes the speed with which the lights come down but would check. As long as the instrument bubble light keeps moving down his window pane, it is not too late. (Although he

may get lower than the proper glide path.) If a light stops moving down the windshield, he is seeing right at it and should pull up. Then when he sees the threshold lights, he's right at his flare-out spot.

One complaint about the contraindication is the Air Force's decision for an ultraviolet "beacon" 1000 ft in front both ends of the runway. This is to place any have a safety zone for low approach, straight take-off, or obstacle landing. Contraindication actually not see into this 1000-ft "flare zone" in some extent. Air Force wants the same 1000-ft clear runway added to a 10,000-ft runway as a 4000-ft runway.

(continued on next page)



Avro's U.S. Sales Campaign

Avro Canada officials shortly will set down with representatives of the Civil Aeronautics Administration and of Canada's Department of Transport to plan an awareness and program for the jetliner named as small-business aviation has been combined.

Whether the program will be carried out with the jetliner now flying or with the so-called plane—expected to fly next summer—is not yet decided. The fact that CAA is being brought in on the first stages of certification indicates strongly that Avro intends to press its way into the U.S. market.

► **Sales Introduction**—Another clue to Avro's sales intentions is the map the company is using to show U.S. routes available for jetliner operation. Presently, on the map routes of American, United, Eastern and National.

On the New York-Miami run, Avro says the jetliner time would be 1 hr. 10 min., as against 1 hr. 3 min. for the transport line. Between New York and Chicago, jetliner time would be 1 hr. 30 min., as against 1 hr. 45 min. for the transport line. The jetliner is also cheaper to operate, Avro mentions in comparison

with air freighters, cargo transport. One of Avro's most interested prospects is G. T. Baker, president of National Airlines. While officials of Avro and of National cannot discuss an contract has yet been signed, and no announcement is expected in the near future.

Avro's optimism over the U.S. market shows in part from a conviction that no real objection to the use by U.S. airlines of foreign planes doesn't exist to the jetliner. This is the argument that since U.S. lines are supported in varying degree by government money, the government would not look kindly upon purchase of foreign aircraft.

Avro thinks it has that argument settled. A spokesman cites three points in rebuttal.

► **Revenue from Canada** is a substantial part of U.S. airline income.
► **Jetliner equipment** is mostly supplied by U.S. manufacturers. It is anticipated that equipment from 100 suppliers will be used in the production version of the jetliner. Even the engine—now made in Britain—may be manufactured in this country.

► **Mounting**—High-intensity approach lights are generally mounted on posts or brackets. If these are tall and rigid they make the crew run a variable task, trip to regulate a low flying in coming-landing plane.

But no system keeps that area evenly clear. The left-hand row gives the best view on clearance. Contraindication, however, says there are two ways for the Air Force to overcome the objection of its "clear row" objective.

► **Mount the lights** low—say two feet high or less, and keep three shoulder clear during a clear row vision.

► **Pilot depth's know** how close to fly to it. He may lose sight of the left hand row if he moves.

► **Pilot has a tendency to wander** away from the left hand row. That's becoming a proper gradual course makes him look to him as if he were going to intersect the row—so he keeps edging his plane to the right of the proper course.

► **Watching the left-hand row**, pilot sees no sharp break in configuration when the approach row runs into the left-side runway lights. But the contraindication is to determine a fairly different configuration than the two-sided runway lights. Pilot approaching on a contraindication knows his runway threshold the instant its outline glows through the mist.

► **Shapeline**—The doppler system shows no constraining advantage. If the pilot follows the sloped light bar indications, his glide slope should theoretically be perfect.

The doppler is sold out of the game currently because in its present form it has several dangerous traps for the pilot who is tired, distracted, or out of practice. Briefly, these are:

► **Although the lines connect**, the pilot looks at them as two vertical lines that only appear to converge because of perspective. Then, when the only possible runway lights appear, the runner looks like the face of a soap bar. If the pilot is faced with contraindication, he's not lost but he's lost a step.

► **The right-and-left** smooth leading indication of the doppler not set in natural or distant is those of the contraindication.

► **Any two-row approach-light system** after three dashes to the runway pilot. The pilot may put back the row and follow it in; he may mistake the two rows for the runway lights and try to land at the approach rate, or he may get too low and not recognize the meaning of the "fly-up" indication of the system. Also, left-right indications of a two-row system cannot be quite as accurate as the contraindication.

A two-row configuration does not present a ground plane as clearly to the pilot as a contraindication row and contraindication



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combination, concludes the IATA group.

The Threshold-High intensity approach lights bring the pilot up to the point where he sees the actual runway, bearing-in threshold. The threshold is too bright. After he sees it, he can land smoothly, provided he was well squared away on his approach when he saw the threshold. Since the pilot is moving at something over 150 feet per second, he has only a few seconds to get down after he sees the threshold through bad weather.

So the marking of the threshold is still the last vital factor allowing the pilot to make his final descent landing. Final touchdown point is precisely at the end of the threshold segment of the runway. The IATA group proposes that the threshold be flanked by special lights to designate it from the approach side on the one hand and from the remainder of the runway on the other.

CAB Says Western Got Too Much Pay

Coal Accruals Board for the first time in its history has issued a final rail pay order fixing a career got too much rail pay.

The Board has announced final rail rates for Western Air Lines and Inland Air Lines. Overpayments of temporary rail pay for periods prior to Jan. 1, 1949, were \$671,474 for Western and \$75,377 for Inland.

The unions now owe their back amounts to the government, the board says. How and when they come through with the money is up to the Post Office Department. Of course, the unions have income to the north of their wish to continue the argument.

Said the board: "In considering the existence of the career rail pay, it should be noted that temporary rail rates are not intended as substitutes for final rail rates since railroad rates are not used for final analysis and necessary procedural steps to process a final rate."

► Tax Adjustments—Chief reason for the overpayment to Western was a \$471,000 reduction in the federal income tax paid, compared with the tax expected and reported in the tentative statement of earnings.

The rest of Western's overpayment—\$192,000—was based on actual 1948 income data, compared with Western's more pessimistic estimates. Primary effect of Western's latest costs on the last half of 1948 was to reduce the amount of the government tax after against the profits from Route 66. "The reason the ruling panel considered 'other monies,' which had been deducted from Western's rail pay need,



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AVIATION WEEK, December 11, 1950

EDITORIAL

Crisis

By all appearances, the United States has suffered one of the most serious military defeats in its history. Perhaps its worst.

The current crisis will set into motion drastic changes. Some can be forecast. Others are now unthought of.

As a nation we are proven woefully weak. We shall start to arm ourselves and our allies in a manner never seen before. Everything else, of course, is subordinate.

Aviation, despite its raging critics, will be needed as never before.

Our aviation will assure the world with the job it will do. Obviously, the job will not be easy for anyone.

Every segment of aviation will be required eventually, pushed to limits and achievements today unheard of. You can be sure of that. Aviation and all of those men and women in it will be ordered to do the responsible, and all of us will wonder to see that they get the means and the materials and the moral support to do the responsible. They'll do it.

That's the extent of our forecasting. Except to assure you that to the limit of our soul and hard working staff,

and to the limit of our facilities, we on *Aviation Week* will do our utmost to serve the country in whatever ways the times permit us to function.

You will see voluntary changes very soon in *Aviation Week*, as it goes up to do an ever-better job in a time of crisis, to improve as a reporter, as a disseminator of vital, needed information, as an educator, analyst and a constructive critic.

You will see other, involuntary, changes in *Aviation Week* too. These will come because of shortages and necessary government regulations and restrictions. These you readers will understand, you will have suggestions too.

This is no time for any kind of posturing and cynical going. It is a time to get to work, under no clouds again, to do the most very serious magazine can do to help those who eventually will bring victory over tyranny. We shall continue to produce the most valuable magazine we know how. No matter what happens. This we pledge.

—Robert H. Wood

Sizing Up the A-Bomb

We believe many of our readers—especially aeronautical and astronaut power engineers and factory managers—should hear about an excellent series of three articles on "How to Size Up the Atom Bomb."

These have just appeared in three issues of *Power Magazine*, a McGraw-Hill publication. They have been bound together in one report. It frequently speaks a difficult mathematical language. So Hal Swann, chief editor of *Power*, has dug out of this book facts that many of our readers should know, and has done it in a manner soundly technical and practical, but not highly theoretical.

"Experts everywhere must understand bomb effects in terms of energy, distance, pressure, temperature, velocity and area," Mr. Swann says. "Only two groups have the capacity to size up the bomb in these terms—the physicists, of whom there are few, and the engineers, of whom there are many."

"Along with his fellow citizens, the engineer has always carried his share of moral community activities. In doing this, he was as better and as worse than the next man. Now he faces a job he alone can do. In most plants and in every community the engineer is the

only man who can know why a bomb does what it does, or just why special protection steps are (or are not) worthwhile. We sincerely hope that many readers of *Power* will see in this situation a unique opportunity for personal leadership in plant and community. This series of three articles (16 pages) is designed to help them seize this opportunity to serve by translating for them the mathematical physics of 'The Effects of Atomic Weapons' into their everyday technical language as engineers."

We recommend this excellent digest and analysis. We shall point out other such valuable contributions to industrial and public safety during the national crisis.

The report is available from *Power Magazine*, Editorial Dept., 116 West 41st St., New York 18, N. Y. Cost is 25 cents, 20 cents each for 35 to 99 copies.

Another booklet "We Are Not Helpless" is available from the New York Times, New York 16, N. Y., for 30 cents. This is a reprint of eight articles by William Lawrence, of the Times, depicting the atom bomb.

The book, itself, "The Effects of Atomic Weapons," is part also in a paper-bound edition from the Government Printing Office in Washington, D. C., for \$2.25. A cloth-bound edition is sold by McGraw-Hill Book Co., 116 West 41st St., New York 18, N. Y., for \$1.80.

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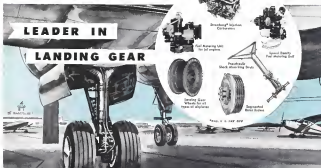
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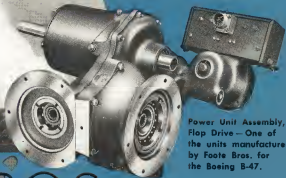
Eight years ago the Boeing B-47 was a dream in a designer's mind. Today this dream ship is the swiftest bomber flying.

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